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Nr. 4. Kirstine Smith: ON THE PLAICE POPULATION OF THE HORNS REEF AREA IN THE AUTUMN OF 1922

KØBENHAVN
C. A. REITZEL, BOGHANDEL
BIANCO LUNOS BOGTRYKKERI
1923

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ON THE PLAICE POPULATION OF THE HORNS REEF AREA

IN THE AUTUMN OF 1922

BY

DR. KIRSTINE SMITH

KØBENHAVN
C. A. REITZEL, BOGHANDEL
BIANCO LUNOS BOGTRYKKERI
1923

CONTENTS

Page

I. Introduction. Material of observations 3
II. Density of plaice 3
a. Variation of density in September 1922 according to locality 7
b. Comparison of density in 1922 with density during the period 1903—1907 7
III. Age and length 10
a. Average length in the different age-groups in September 1922 10
b. Comparison between the average lengths for age-groups in 1922 and in 1905—1907 14
IV. Sex 16
a. Proportion of the two sexes in September 1922 16
b. Proportion of the two sexes as found from the Danish observations in the years 1903, 1905, and 1907 19
c. Has the relative frequency of the sexes altered? 20
V. Investigations of marketable plaice landed in Esbjerg 22
a. Frequencies of lengths in the areas B_4 and B_5 22
b. Frequencies of lengths in the areas C_2, B_1 and D_2 24
c. Frequencies of lengths in the area A_3 25
d. Age of the marketable plaice in B_c in the autumn of 1922 26
e. Density of marketable plaice in the autumn of 1922 28
VI. Marking experiments in the spring of the years 1920 and 1921 29
a. Migrations of marked plaice 29
b. Percentage of marked plaice recaptured 35
c. Rate of growth of marked plaice 36
VII. Summary 37
List of Literature 40
Tables of Measurements A 41
Table of Measurements B 53
Dansk Resumé 66

I. Introduction.

Material of observations.

For some years the lack of a research steamer made it impossible from Danish side to undertake fishing experiments in the open North Sea and it was only possible to investigate the varying density and growth of the plaice population by means of information afforded by the fishery statistics and by the examination of marketable plaice. Although these means enabled one to follow in broad outlines the changes produced by the war conditions, yet one felt very keenly the need for more direct information in order to give a detailed picture of the present composition of the plaice population in the Horns Reef area, where the Danish plaice fishery in the North Sea mainly takes place. Therefore on the first cruise in the Danish waters with the new research steamer "Dana", one of the chief tasks was to carry out fishing experiments with special regard to plaice.

During the cruise in September 1922 Dr. A. C. Johansen worked 33 Stations in the Horns Reef area from the coast to 5°39 E. L. and between 55°00 and 56°08 N. Lat. (laid down in Fig. 2). The apparatus used was a 50 feet otter-trawl with extra cod-end and the experiments lasted from $^1/_2$ hour to 2 hours at each station, all the plaice caught being counted and as a rule measured. At most of the stations the age was determined from the otoliths and the sex noted for all individuals, excepts those of the 0-group. But at 12 stations, where the catches were very large, the age and sex were determined for a portion only of the specimens occurring in the length groups most frequently represented, and the remainder of the specimens were distributed in proportion to those examined. The observations are fully recorded in the Tables of Measurements A.

As a supplement to the fishing experiments, a series of measurements of marketable plaice from the Horns Reef area, landed in Esbjerg, was carried out during September to November 1922, chiefly in October. A total of 23,299 plaice were measured, distributed among 247 samples, of which 145 belonged to catches taken in the part of the international area B_4 situated north of Horns Reef, this part of B_4 being, at the time, much richer of marketable plaice than the still more densely populated area west of Graa Deep. The measurements are recorded in Table of Measurements B.

Finally Dr. A. C. Johansen has placed at my disposal the records of the marking and transplantation experiments carried out in the Horns Reef area during 1920 and 1921, of which a full record will not be given, but only the abstract contained in the figures and tables of section VI.

II. Density of plaice.

From the Tables of Measurements A the number of plaice of each age-group caught per hour by a 50 feet otter-trawl has been calculated and the results are represented in Fig. 1. Fig. 2 gives the total number of individuals caught per hour. The figures vary considerably even amongst neighbouring stations, and a clearer view is obtained by considering average values for groups of stations. We therefore grouped the stations according to six areas, bounded in the following way:

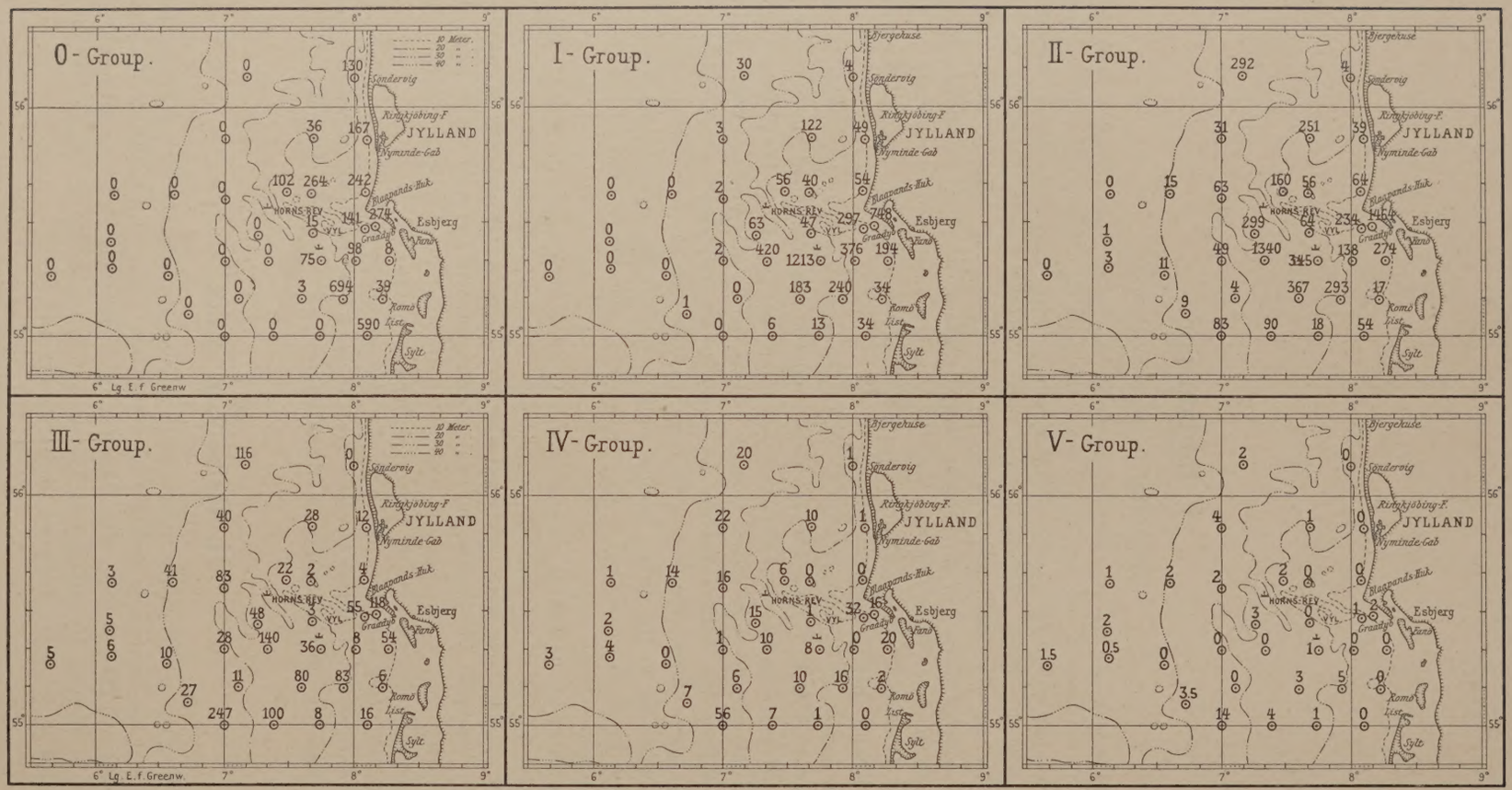

Fig. 1. Showing number of plaice of each age-group caught per hour by a 50 feet otter-trawl with extra cod-end. — September 1922.

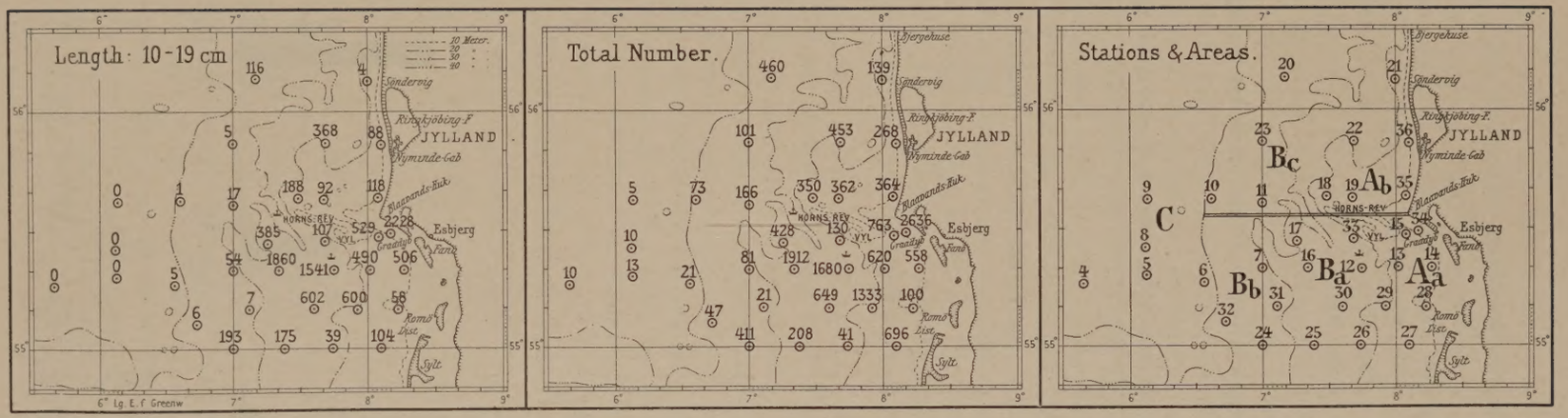

Fig. 2. Showing: (1) Number of plaice of the length 10—19 cm, (2) total number of plaice caught per hour by a 50 feet otter-trawl (with extra cod-end), and (3) stations (designated by their numero minus 2800) and areas used in the present paper. — September 1922.

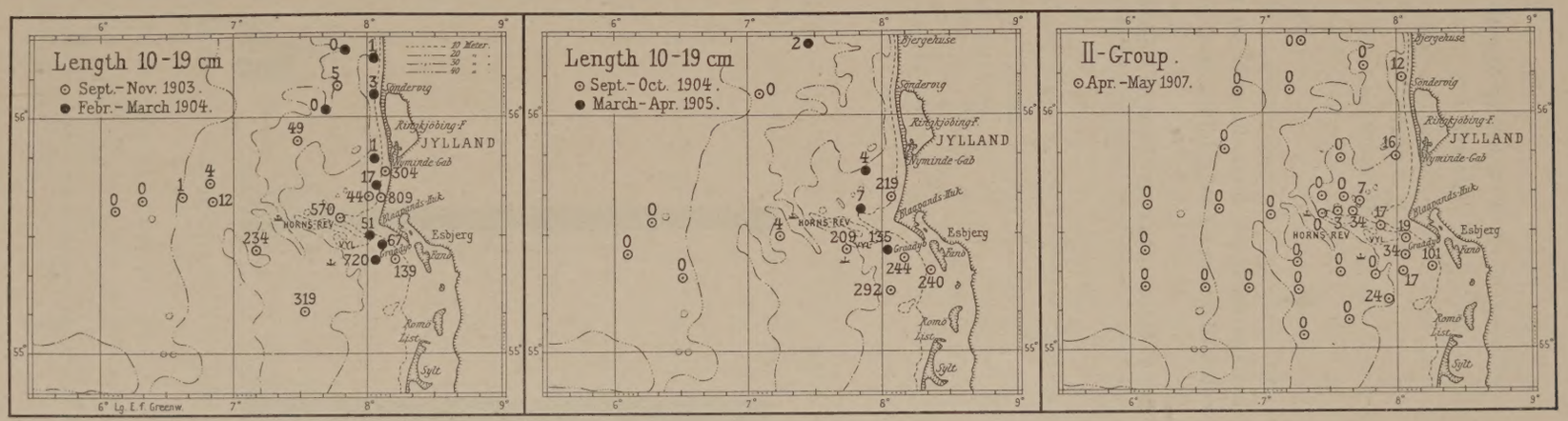

Fig. 3. Showing number of plaice within given size limits or of given age caught per hour by a 50 feet otter-trawl with extra cod-end.

A_a south of Horns Reef, Depth: 0—20 metres
A_b north „ „ „ „ 0—20 „
B_a south „ „ „ „ 20—30 „
B_b south „ „ „ „ 30—40 „
B_c north „ „ „ „ 20—40 „
C „ over 40 „

(See Fig. 2).

The average catch per hour, for each of these areas, is given in Table 1 and for the age-groups 0—IV represented diagrammatically in Fig. 4.

Table 1. Number of Plaice caught per hour by a 50 feet otter-trawl (with extra cod-end) in each Area. Sept. 1922.

Age-group	0	I	II	III	IV	V	VI	VII	Total	Number of stations
Area										
A_a	263	275	353	49	12.3	1.1	0.7	. . .	954	7
A_b	181	41	65	8	1.6	0.4	. .	. .	297	5
B_a	13	278	360	59	7.4	1.6	0.4	. .	719	7
B_b	. .	0.6	36	78	17.5	4.4	0.8	0.3	138	4
B_c	7	31	131	62	16.4	2.4	. .	. .	250	5
C	. .	. .	2.9	5.7	1.9	0.8	0.2	. .	11.5	5

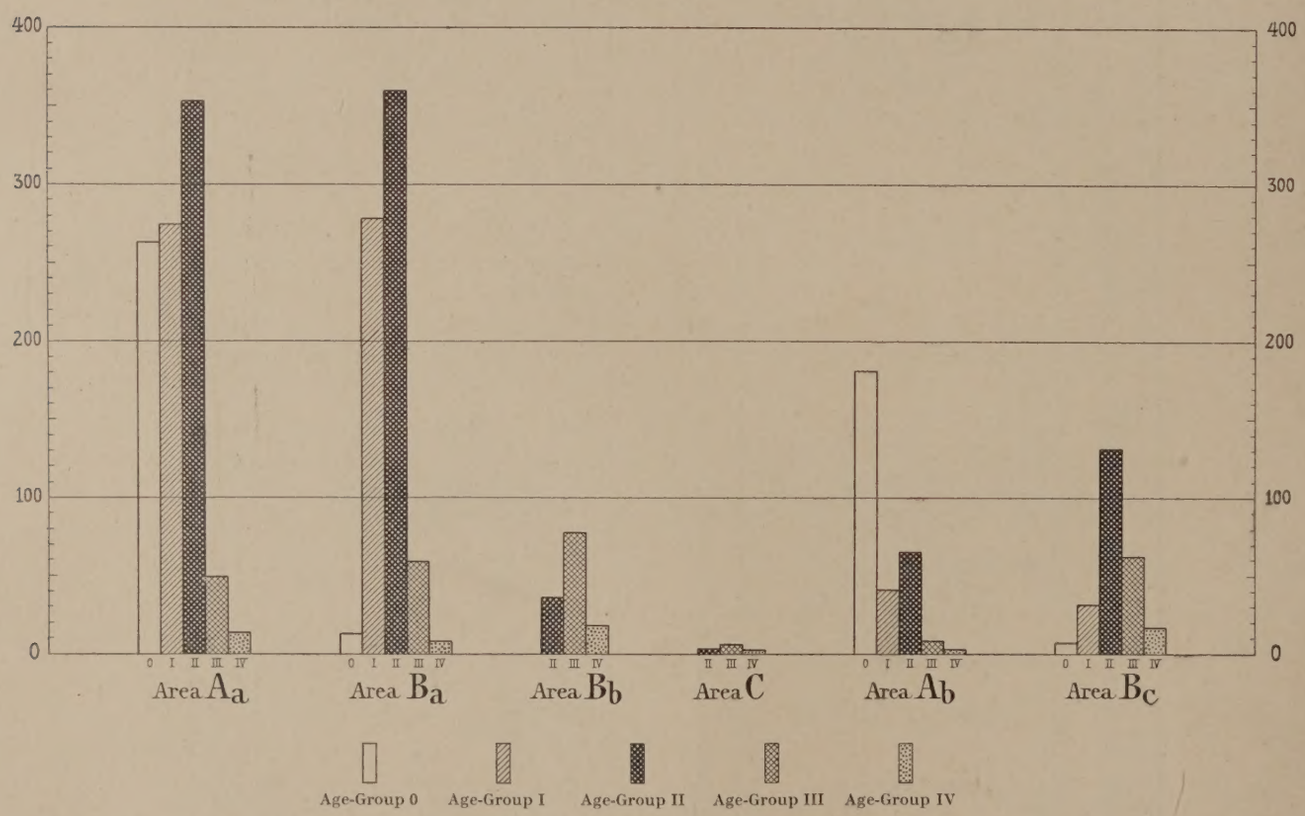

Fig. 4. Diagram showing for each area the number of plaice of each of the age-groups 0—IV caught per hour by a 50 feet otter-trawl with extra cod-end. — September 1922.

a. Variation of density in September 1922 according to locality.

The charts of Fig. 1 illustrate clearly the well-known fact that the young plaice live near to the coast and gradually, as they grow older, move to the greater depths and spread over greater areas, some of the older specimens still remaining in the coastal area.

The 0-group is, in September, found largely in the areas A_a and A_b, and it is not caught at greater depths than 23 metres. On the whole, it is not much more frequent in A_a than in A_b. Each of the other age-groups is on an average, of equal density in B_a and A_a and in these areas, it is several times as numerously represented as in A_b. Therefore within the 20 metres depth-curve the total density of the plaice population, as measured by these catches, is three times as large south of Horns Reef as north of Horns Reef. The I- and II-groups are most frequent in A_a and B_a, and they have both of them, in a northerly to southerly direction, a maximum density about west of Graa Deep. The I-group does not occur in depths of more than 36 metres. The II-group is met with at all the stations except two of the most westerly. The III-, IV- and V-groups are especially frequent in the areas A_a, B_a, B_b, and B_c. Outside the 20 metres curve they are not essentially more numerous in the southern (B_a and B_b) than in the northern part (B_c) of the waters investigated, and in the northerly to southerly direction, no maximum of density is observed for these age-groups.

We have compared here the density of the same age-group in various areas, but if instead, we group the plaice according to size and for instance ask for the density of marketable plaice, we arrive at quite another result because of the different growth rate north and south of Horns Reef. The density of marketable plaice will be dealt with in section V.

b. Comparison of density in 1922 with density during the period 1903—1907.

From Danish side no experiments of fishing with otter-trawl have taken place since 1907, and the examination of otoliths was not generally carried out before the summer of 1905. Therefore from the fishing experiments undertaken in 1903 and 1904 and in the spring of 1905, we have no measure of the density of separate age-groups, but we may, for plaice of a given size-group, compare the density found in 1922 with that found at the earlier period.

In Fig. 2 and Fig. 3 the frequencies of plaice of lengths 10—19 cm are represented. It will be seen from these charts, that, in September 1922, the density of such plaice was in the areas A_a and B_a, three times as great as it was in the autumn of 1903 and of 1904 and in the spring of 1904 and of 1905. In A_b, however, the density of these plaice appears smaller in September 1922 than in the autumn of 1903 and of 1904, but, on the other hand, the experiments during the spring of 1904 and 1905 show a still smaller density than the experiments in 1922. In C and the outer parts of B plaice of these sizes are scarce, and there is no evidence that they were more numerous in 1922 than in the earlier period.

As will be seen from the next section, the growth of plaice in the Horns Reef area has, in 1922, been extraordinarily small, from which it follows, that the size-group 10—19 cm was not of the same composition as regards age in 1922 as in the autumns of 1903—1905. It is therefore essential to elucidate as far as possible, whether, or to what extent, this fact might account for the great difference of density observed for the areas A_a and B_a.

We shall first consider the age of plaice of the lengths 10—19 cm in September 1922. If we add together the plaice caught per hour at all the stations, we find that in this sum the specimens of 10—19 cm cover (1) the I-group except a few (6 %) of the smallest, (2) the II-group except a few (7 %) of the largest, and (3) about half (51 %) of the III-group. The lengths of plaice of the same age, however, differ in the various areas. In A_b and the most northerly part of A_a the number of plaice of 10—19 cm equals the number of individuals belonging to the I- and the II-groups, but in the southern part of A_a and B_a this

particular size-group is more numerous than the two age-groups, because it contains also an essential part of the III-group, on the other hand in C and the outer regions of B_4, plaice of the lengths 10—19 cm do not comprise all plaice of the II-group, which here contains individuals longer than 19 cm. In the northern parts of A_a and B_a, where the fishing experiments in 1903—1905 took place, the number of plaice of the lengths 10—19 cm in 1922 only exceeds the total of the I- and II-groups by 3 per cent.

According to the results from two stations from A_a and B_a investigated in September 1905[1] the plaice of 10—19 cm at that time comprised only the I-group and about two thirds of the II-group. From the experiments[2] of marking it is known that the growth rate was exceptionally quick in 1905, viz. 8 cm, and in the foregoing years slower, viz. 5.5 and 4.0 cm. It may therefore be assumed that plaice of the lengths 10—19 cm in the autums of 1903 and 1904 comprised at least as great a part of the II-group as in 1905. The growth rate appears to be less variable from year to year for the I-group than for the older fish, so that we may reckon that it contains in the autumns of 1903 and 1904 practically no specimens smaller than 10 cm. Assuming the I-group and the II-group to be of equal frequency in the catches, and assuming the density of each year-group to be equal in the two periods compared, we should, according to the altered rate of growth, expect the density of plaice from 10—19 cm to have increased by the ratio

$$\frac{1+1}{1+\frac{2}{3}} = \frac{6}{5}.$$

Instead of this we have found that the density of this size-group in the northern parts of A_a and B_a has been trebled, and there is, therefore, no doubt that both the age-groups I and II in these waters have been represented by much greater numbers in 1922 than in 1903 and 1904.

Table 2. Number of Plaice Caught per hour by a 50 feet otter-trawl with extra cod-end. Sept. 25.—30. 1905.

Age-group	0	I	II	III	IV	V+	Total
Station No. with indication of area							
587[1] in A_a	37	158	69	9	1	..	275
591[1] „ B_a	..	60	84	37	4	0.5	190
593[1] „ C	..	..	2	20	15	3	43
594[1] „ C	..	..	..	..	..	2	2
595[1] „ C	..	..	..	1	1.5	0.5	3.5
247[2] „ A_a	..	..	..	..	..	..	330[3]
257a[2] „ A_a	..	..	..	..	..	..	334[4]
246[2] „ A_b	..	..	..	..	..	..	396[5]

[1] See A. C. Johansen: 1908 p. 11. At St. 591 no extra cod-end.
[2] See A. C. Johansen: 1910 Tabelle 52.
[3] Of these 240 are 10—19 cm of length.
[4] „ „ 244 „ „ „ „ „
[5] „ „ 219 „ „ „ „ „

From September 1905 samples whose age has been determined from the otoliths are available from a few stations in the Horns Reef area. The catches per hour are given in Table 2. It will be seen that at Station 587, the only station in A_a, the density for every age-group is considerably below the average density for A_a found in Sept. 1922, and for the II- and III-groups, the density is even as small as one fifth of the corresponding average densities in 1922, but there are for each age-group one or two stations in 1922 with a still smaller density than in 1905. Also the Station 591 in B_a shows for each age-group and especially for the I- and II-groups a smaller density than the average value for B_a in 1922,

[1] A. C. Johansen 1910, Table 58 and 66.
[2] „ „ „ 1915, Fig. 25.

but again it is possible in the case of each age-group, to point to a couple of stations from 1922 which show an even smaller density than that found for Station 591. For Stations 593, 594, and 595 in C the densities are, however, not essentially smaller in 1905 than the average value for C in 1922. Regarding the total number, and also the number of plaice of the sizes 10—19 cm, we have, moreover, information from three stations from A_a and A_b which show a somewhat greater density than St. 587 in A_a. On the whole it appears that the total density west of Graa Deep is about 3 times as great in 1922 as in 1905, and that the density of the II-group has perhaps increased by an even greater rate. But the only station in A_b observed in 1905 has a somewhat greater total density than the average total density for A_b in 1922.

Table 3. Number of Plaice caught per hour by a 50 feet otter-trawl with extra cod-end in each Area. April 27.—May 10. 1907.[1]

Age-group	I	II	III	IV	V+	Total	Number of stations
Area							
A_a	8	38	45	9	0.3	103	8
A_b	2	8	16	2	0.1	29	9
B_a	0.3	3	6	2	0.9	13	7
B_b	..	..	..	1	..	2	1
B_c	..	..	1.2	0.4	0.3	1.9	7
C.....	..	..	0.4	0.5	0.6	1.6	5

[1] See A. C. Johansen 1908, pp. 11—12.

In the spring of 1907 the catch per hour is even smaller than in the autumn of 1905 (see Table 3 and Fig. 3). For the I-group and perhaps also for the II-group, the smaller lengths of the fish in May may partly account for the extremely small catches per hour. At any rate there is not, for the III- and IV-groups such large differences between the values for 1907 and for 1922. The numbers in these groups are, in A_a and A_b, about as frequent in May 1907 as in September 1922, but in B_a and B_c, they are much less so in 1907 than 1922. One would expect to find in May, an accumulation of individuals belonging to these age-groups in A_a and B_a which vanishes during the course of the summer when the plaice again migrate to deeper waters. For this reason a better basis of comparison is perhaps obtained by considering the average density for all the areas, and for the III- and IV-groups this is about four times as great in September 1922 as in May 1907.

The general impressions obtained from a comparison of the results of the fishing experiments of 1903 to 1907 with those from September 1922 are the following:

The individuals belonging to each of the age-groups I and II are, in 1922, at least three times as numerous west of Graa Deep inside the 30 metres curve as in the earlier period, and the same is the case for the III-, IV- and V-groups as far as the data afford any information, but there is no evidence that the density outside the 30 metres curve has been greater in 1922 than in the earlier period, and on the coastal grounds north of Horns Reef the density appears to be at least as great in the autumns 1903—1905 as in 1922.

The most certain and well-founded of these results is the great increase of individuals of the I- and II-groups in the areas A_a and B_a. From B_b no observations were taken during the years 1903—1905, and the stations examined during these years are, on the whole, so scattered that they do not give a clear picture of the regional distribution for each age-group. We therefore do not know with certainty whether the mass of each of the age-groups is to be found at the same distance from the shore in 1903—1905 and in 1922. But on the other hand the stations from A_a, B_a and C examined during the years 1903—1905, do not contain any indication of the maximum densities of the I- and II-groups being found outside

B_a, where the maximum densities in 1922 occur. The observations of densities therefore lead to the conclusion that also the densities of the total age-groups I and II south of Horns Reef in 1922 was at least two or three times as great as during the period 1903—1905.

We shall next consider the density of the 0-group.

Table 4. Number of Plaice in the 0-Group caught per hour by a 50 feet otter-trawl (with extra cod-end).

Autumn experiments.

Area	A_a	A_b
Year	Number of spec. at each station	Number of spec. at each station
1903—1905	6, 37, 39, 42	30, 112, 127, 248
1922	8, 39, 98, 141, 274, 590, 694	102, 130, 167, 242, 264

The frequency of the 0-group observed in September 1922 may be compared with observations from four stations from each of the areas A_a and A_b taken in the autumns 1903—1905. It will be seen from Table 4, that in A_a the 0-group is several times as large in 1922 as in 1903—1905, when the greater frequencies above 100 per hour do not occur at all. For A_b the difference is less marked. From fishing experiments with young-plaice-trawl it is known[1] that the 0-group as a rule is more frequent in A_a than in A_b, and the figures for 1922 are, in that respect, more normal than the other.

The experiments[1] with young-plaice-trawl in the summers of 1920 and 1921 indicated that the density of the 0-group at the west coast of Jutland was not unusually great as compared with the density in the pre-war years.

Thus it is only for the year 1922 that we have some evidence of a greater density of plaice fry, but the experiments with young-plaice-trawl in 1920 and 1921 are not extensive enough to warrant our excluding the possibility that the plaice fry in the North Sea was, on the whole, denser in 1920 and 1921 than usual.

The abundance of individuals of the I- and II-groups south of Horns Reef in September 1922 favours the assumption that the amount of plaice fry in 1920 and 1921 has been unusually rich as compared with pre-war years. The general change observed in the quantity and quality of the plaice population of the North Sea also supports this assumption. The stock of marketable plaice in the North Sea reached probably a post-war maximum number in 1919 as a consequence of the restriction on fishing during the War.[2] As the average age of the marketable plaice had also increased during the War most probably the number of spawning plaice showed a proportionately more pronounced maximum at that time, and it is probable that in 1920 and 1921 their number might still be considerably above the pre-war value.

III. Age and length.

a. Average length in the different age-groups in September 1922.

The average lengths for age-groups contained in the 'Tables of Measurements A', are represented on the charts of Fig. 5. They show that in the same way as the average age and the average length of all the plaice increase from the coast seawards, so on the whole does the average length of plaice in each single year-group increase. The plaice is not only, to a certain extent, sorted naturally according to age, but the single year-groups are also sorted partly according to length. This can be noticed distinctly even in the case of the 0-group, and it is still more conspicuous in the following age-groups. But in addition to this gradation of size there are characteristic differences between the average length of an age-group south and north of Horns Reef.

[1] A. C. Johansen 1922 p. 14.

[2] Compare: Fr. Heincke 1922, H. Henking 1922, p. 80, and J. O. Borley 1923, pp. 41—42.

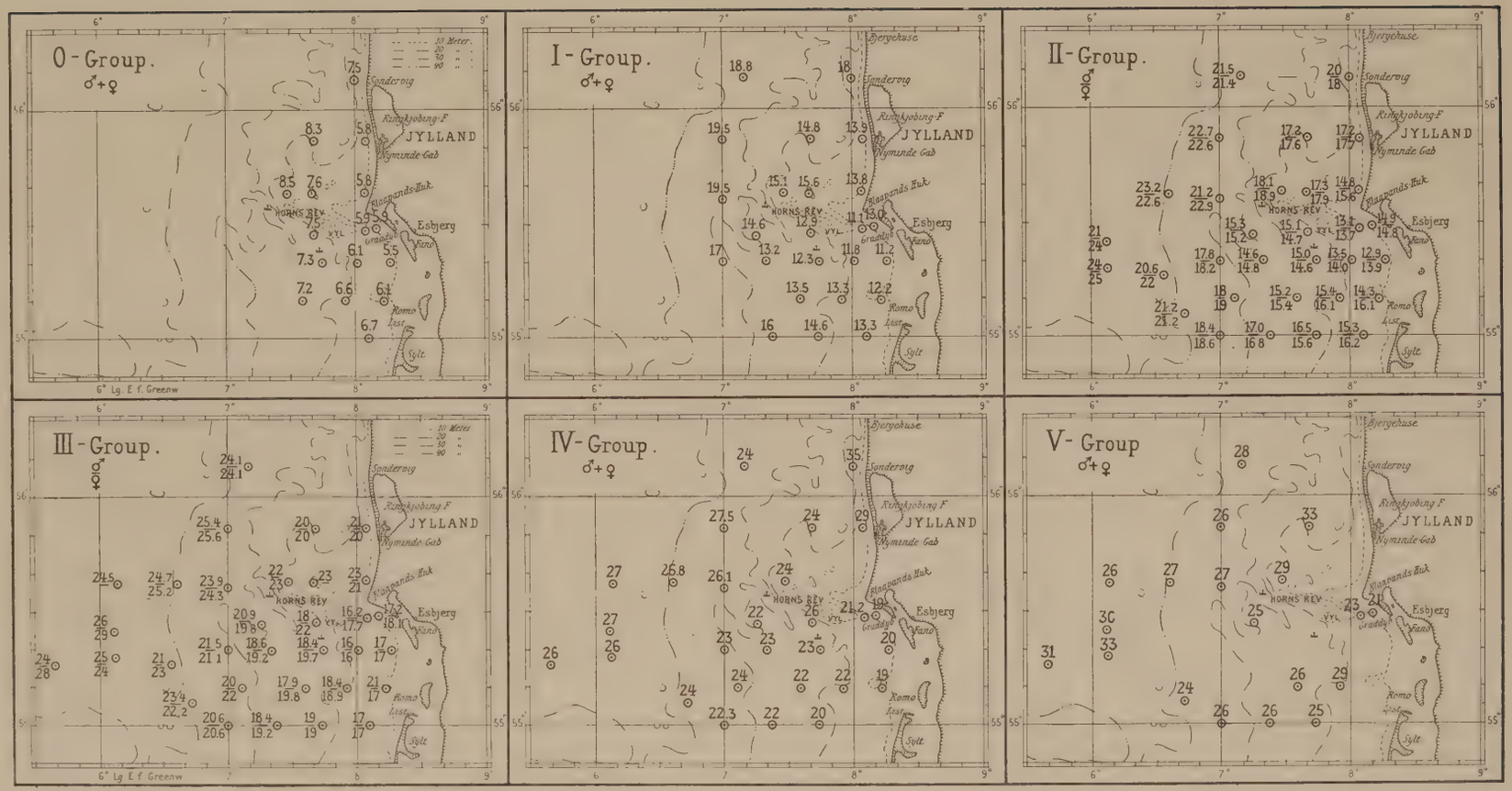

Fig. 5. Showing average lengths (cm) of plaice in the age-groups 0—V. September 1922

Table 5. Average Length in Age-Groups for each Area. September 1922.

Age-group	0	I		II		III		IV		V
Sex	♂+♀	♂	♀	♂	♀	♂	♀	♂	♀	♂+♀
Area										
A_a	6.42	12.29	12.37	14.56	14.70	17.33	17.86	20.0	21.3	25.9
A_b	6.87	14.7	14.5	17.30	17.89	21.9	21.2	25.6	28.5	28.5
B_a	7.30	12.64	12.82	14.98	14.94	18.69	19.42	22.2	22.1	25.4
B_b	..	..	..	18.23	18.74	20.94	20.78	22.9	22.5	25.4
B_c	8.3	15.7	15.7	19.87	20.18	24.03	24.10	26.8	24.7	27.2
C	..	..	..	21.2	23.0	23.7	24.8	26.4	26.3	29.3

The average length of the 0-group (see Table 5) is already somewhat greater north of Horns Reef in A_b than south of Horns Reef in A_a. For the following age-groups there is an increasing difference between the average lengths in A_b and A_a, so that the II-, III- and IV-groups in A_b have about the same

Table 6. Lengths in Age-Groups for the Areas south and north of Horns Reef. September 1922.

Age-group	0		I		II		III		IV	
	s	n	s	n	s	n	s	n	s	n
Area	$A_a + B_a$	$A_b + B_c$	$A_a + B_a$	$A_b + B_c$	$A_a + B_a + B_b + C$	$A_b + B_c$	$A_a + B_a + B_b + C$	$A_b + B_c$	$A_a + B_a + B_b + C$	$A_b + B_c$
Length cm	%	%	%	%	%	%	%	%	%	%
4	2	2	..	..	..	..	..	..	..	..
5	25	29	..	..	..	..	..	..	..	..
6	50	21	..	..	..	..	..	..	..	..
7	22	26	..	..	.	..	..	..	..	..
8	1	19	1	..	..	..	..	..	..	..
9	..	4	6	..	.	..	..	..	..	..
10	..	..	13	3	..	..	..	..	..	..
11	..	..	18	6	3	..	..	..	..	..
12	..	..	24	13	10	1	..	..	..	..
13	..	..	20	13	19	2	1	..	..	..
14	..	..	11	20	23	5	2	..	..	..
15	.	..	4	11	18	7	6	..	..	..
16	..		2	11	12	13	12	1	2	..
17	..	..	1	10	6	10	15	..	4	2
18	..	..	..	7	3	12	18	3	5	2
19	..	..	..	3	2	12	11	4	12	4
20	..	..	..	2	1	9	12	5	12	2
21	..		..	1	..	11	8	12	18	1
22	..	..	..	..	..	8	6	15	15	10
23	..	..	..	..	..	5	3	16	9	6
24	.	.	..	..	..	3	2	11	7	14
25	.	..	..	..	..	2	2	10	7	5
26	..	..	.	..	..	1	1	9	3	13
27	.	..	..	..	..	1	..	5	3	12
28		..	.	..	..	..	1	4	..	11
29	..	..	.	..	..	..	..	2	..	5
30	..	..	.	..	..	.	..	1	..	6
31	.		..	..	..	..	..	..	..	1
32	..	.	.	..	..	..	..	..	..	2
33	..	..	..	..	..	..	..	..	..	..
34	..	..	..	..	..	..	..	1	..	2
Average Length[1] cm	6.5	6.9	12.5	15.1	14.9	19.2	19.3	23.8	22.0	25.8

[1] Corrected by 0.5.

average lengths as the III-, IV-, and V-groups respectively in A_a. The average length is, however, not much larger in B_a than in A_a, especially not in the I- and II-groups. The distribution of frequencies, as well as the average lengths for these age-groups, suggests therefore that there is an active interchange of plaice between A_a and B_a, whilst the Horns Reef acts as a boundary between A_a and A_b thereby causing each of these areas to have a population with distinct characters. For the I- and II-groups it is noticed that the average length in the north to south direction has a minimum value in A_a and B_a west of Graa Deep, at that place, where for the same age-groups, a maximum of density was observed. For the III- and IV-groups such a definite minimum value of the average length can not be demonstrated and neither did there occur any maximum of density for these age-groups. On the whole, the average lengths for these age-groups decrease as one passes from north to south.

The considerable difference in length between plaice of the same age living north and south of Horns Reef is further illustrated by Table 6. It gives, for the two areas $(A_a + B_a + B_b + C)$ and $(A_b + B_c)$ and for each age-group, the distribution of lengths per 100 individuals and the average length. The table is calculated so that each station has been weighted according to the number of plaice caught per hour, and it gives therefore a complete picture of each age-group for each of the two areas, and affords the means of determining the anual growth. Assuming that the average length for each age-group is the same in 1921 as in 1922 we find from Table 6 the values for annual growth given in the following table:

Table 7. Annual Growth in centimetres.

Year of life	1st	2nd	3rd	4th	5th
Southern area	6.5	6.0	2.4	4.4	2.7
Northern area	6.9	8.2	4.1	4.6	2.0

It will be seen that the growth during the second and third year is decidedly larger in the northern than in the southern area.

While it is, on the whole, impossible to decide to what extent the gradation according to size from the coast seawards is produced by the larger fish having a greater disposition to emigrate than the smaller ones and to what extent by a better nourishment on the seaward grounds, it is somewhat easier to explain the reasons why the plaice of a given age are larger north than south of Horns Reef. The differences between the density and the average length for the I- as well as the II-group in the areas south and north of Horns Reef are so considerable and so sudden, as will be seen from the charts Fig. 1 and 5, that it is difficult to imagine that a frequent exchange of individuals of these age-groups occurs between A_a and A_b. The possibility that the great average lengths in A_b should arise as a result of a selective immigration of large individuals from A_a to A_b is therefore not probable, and it appears more likely that a difference in nourishment produces a difference in growth in the two areas. The extraordinarily large density observed for the I- and II-groups west of Graa Deep supports this explanation, The density of individuals belonging to these two annual groups is in A_a and in B_a 6 –7 times as great as in A_b and 9—10 times as great as the total density of older plaice in A_a and B_a, so that their number has an essential influence on the amount of nourishment per individual. Together with the maximum of density in A_a and B_a we found, as mentioned, for the same distance from the coast a minimum of average length for the I- and II-groups. Such a minimum is not found for the III- and IV-groups, which present a decreasing average length from north towards south, when comparing stations at the same distance from the coast. This is not astonishing because plaice of these age-groups have spread over the total area here investigated, and one may suppose that they have already performed so wide annual migrations that their state of nourishment is much less determined by the conditions of the locality where they are caught, although even for these age-groups there is a marked gradation of length from the coast seawards and from south towards north. In harmony with this view there is no essential difference of growth in the

4th and 5th year of life to be found for the two areas considered in Table 7. Outside the 20 metres curve one must expect a free interchange of plaice over three years of age to go on between the two areas, and there is no reason to suppose that the condition of nourishment is better in B_c than in B_b, where the population of plaice seems to be as dense as in B_c.

b. Comparison between the average lengths for age-groups in 1922 and in 1905—1907.

The only unsorted samples, examined as to otoliths, available from former years are those which were obtained in September 1905 and during Apr.—May 1907, and which were mentioned in the previous section.

Table 8. Average Length (cm) in Age-Groups. Sept. 1905 and Sept. 1922.

Age-Group	I		II		III		IV		V		Depth
Station No. with indication of area	1905	1922	1905	1922	1905	1922	1905	1922	1905	1922	m
587[1] in A_a	11.7	..	19.1	..	23.5	..	27.5	..	..	..	6—7
2834 „ „	..	13.0	..	14.9	..	17.7	..	19.4	..	20.5	8
2815 „ „	..	11.1	..	13.4	..	17.2	..	21.2	..	22.5	14—19
591[1] in B_a	13.0	..	18.7	..	23.8	..	28.1	..	..	..	20
2812 „ „	..	12.3	..	14.8	..	19.2	..	23.4	..	19.5	23
593[1] & 595[1] in C.	14.6	..	25.4	..	26.3	..	29.1	..	32.9	..	45
2804 in C.....	..	..	..	..	..	25.9	..	26.3	..	30.5	44
2805 „ „.....	..	..	..	24.5	..	25.0	..	26.2	..	32.5	45 & 54

[1] See A. C. Johansen 1910, Tab. 58, 66 and 70.

In Table 8 the average lengths in the different age-groups, from the stations examined in 1905, are compared with the corresponding values for the nearest stations in 1922. It will be seen that there is no essential difference between the average length of the I-group in 1905 and 1922. The following table gives the difference in centimetres between the average length in age-groups in Sept. 1905 and Sept. 1922.

Table 8 a.

Age-group	II	III	IV
Area			
A_a	5	6	7
B_a	4	5	5
C	1	1	3

The table shows, in the age-groups II, III and IV, a very considerable difference for the stations in A_a and B_a. A comparison between the average lengths from these areas in Table 8 and the charts Fig. 5 shows that the large average lengths of the II- and III-groups in September 1905, are, in September 1922, found only in the utter-most part of B_b, and that values as large as those of the IV-group in 1905, do not occur at all in 1922 at any station inside the area $(A_a + B_a + B_b + C)$. Thus it is clear that, even if the young age-groups should be somewhat more concentrated to the neighbourhood of the coast in 1922 than in 1905, what might be suspected to occur together with the smaller length at each given place, this cannot affect the comparison much. We shall therefore in the following consider the differences found here as approximations to the differences between the means for the total age-groups in the area south of Horns Reef. Between the stations in C the difference is smaller, but nevertheless essential.

It has been found in previous investigations[1] that the growth of the 0- and I-group in the Horns

[1] A. C. Johansen 1910, Table 52—59.

Reef area does not vary much from one year to another, and therefore even if the I-group had approximately the same average length in Sept. 1905 and Sept. 1922, we must not conclude that the growth in the other age-groups has been equal during the summers of 1905 and of 1922. On the contrary we must suppose that the very considerable difference between the average lengths of the II-groups in the two periods can be considered as a measure of the difference of growth for the age-groups II to IV in the area ($A_a + B_a$) during the two summers, although the still greater differences in the III-group and in the IV-group indicate that the growth during the summer of 1904 also must have been quicker than during the summer of 1921. As the differences of lengths are so much smaller for the stations in C it is permissible to suppose that the growth in these waters has been about equal in 1904—1905 and in 1921—1922, and that it is while living in the more coastward waters that the plaice caught in C have been subjected to different environments, causing a different rate of growth.

Table 9. Average Length (cm) in Age-Groups. April—May 1907 and Sept. 1922.

Age-group	I	0	II	I	III	II	IV	III	V	IV	Depth m
Year	1907	1922	1907	1922	1907	1922	1907	1922	1907	1922	
Station No. with indication of area											
975 A_a	8.5	..	13.4	..	21.4	..	25.8	..	28.5	..	15
2815 „	..	5.9	..	11.1	..	13.4	..	17.2	..	21.2	14—19
2813 „	..	6.1	..	11.8	..	13.8	..	16.0	..	..	17
993, 995 & 1002 A_a	8.1	..	13.2	..	20.7	..	25.2	..	35.5	..	13—18
2814 „	..	5.5	..	11.2	..	13.5	..	16.8	..	20.2	13
2829 „	..	6.6	..	13.3	..	15.8	..	18.7	..	22.1	19
977 & 978 „	8.8	..	14.6	..	21.3	..	24.8	..	25.5	..	ca. 26
2815 „	..	5.9	..	11.1	..	13.4	..	17.2	..	21.2	14—19
2819 A_b	..	7.6	..	15.6	..	17.6	..	22.5	..	..	12
980, 981, 982 A, 983 B, 984 & 985 A_b	9.7	..	18.8	..	23.1	..	29.7	..	32.5	..	6—24
2818 „	..	8.5	..	15.1	..	18.5	..	22.2	..	23.6	16
2819 „	..	7.6	..	15.6	..	17.6	..	22.5	..	..	12

In Table 9 the average lengths in the age-groups I, II, III, ... as found in April—May 1907, are compared with the average lengths in the age-groups 0, I, II, ... as found in September 1922 at the closest neighbouring stations. The following tables gives the average deviations in centimetres for A_a and A_b.

Table 9 a.

Age-group	I—0		II—I		III—II		IV—III		V—IV	
	1907	1922	1907	1922	1907	1922	1907	1922	1907	1922
A_a	2		1		7		7		9	
A_b	2		3		5		7		9	

According to the experiments of marking[1] 2 centimetres of these deviations must be considered as due to the growth which has taken place between the middle of September 1906 and the beginning of May 1907, but there still remains considerable deviations, which are probably not due entirely to differences in growth. There is no doubt that the larger plaice approach the coast in spring, and just at the beginning of May they are, as a rule, most frequent in the coastal waters near Horns Reef; therefore it must be excepted that at this season a higher percentage of the larger plaice of each age-group is present in A_a and B_a than at the end of the summer, when the larger plaice have again migrated into deeper

[1] A. C. Johansen 1915 Fig. 25 p. 32.

waters. For this reason it is perhaps of greater interest to compare the average lengths in the spring of 1907 with the average lengths for the total age-groups in 1922 as given in Table 6. The following differences are found:

Table 9 b.

Age-group	I—0		II—I		III—II		IV—III		V—IV	
	1907	1922	1907	1922	1907	1922	1907	1922	1907	1922
A_a	2		1		6		6		8	
A_b	3		4		4		6		7	

Even if a growth of 2 cm is admitted to take place between September and May, the age-groups II, III and IV in 1922 still shows a considerable inferiority in size.

Assuming that the difference in length between the III-group in the spring of 1907 and the II-group in September 1922, after deduction of the 2 cm mentioned above, is due substantially to difference of growth rate in $(A_a + A_b)$ during the summers of 1906 and 1922, we find that the growth rate was about 3 cm higher in 1906 than in 1922, while we have found above that it was about 4.5 cm higher in 1905 than in 1922. According to the experiments of marking the growth rate in the Horns Reef area was 7.9 cm in 1905 and 6.1 cm in 1906, from which two values we find for the growth rate in 1922 for young plaice older than two years, the values 3.4 cm and 3.1 cm respectively.

For A_b we find from the survey above, that the growth rate in 1906 was only 2 cm larger than in 1922, which agrees well with the fact that the extraordinarily high density of population in September 1922 does not extend to A_b.

While the present measurements of length have given rather precise information about the growth rate in 1922, they afford a more uncertain basis for deducing the growth in 1921. We can only state that the growth in 1921 in all probability has been less than the growth in 1905 and in 1904, since the average lengths for the III- and IV-groups appear so small in 1922 as compared with former years. For 1920 the marking experiments from the Horns Reef area has determined the rate of growth to be ca. 7 cm (see section VI). It is therefore probable that the unusually small average lengths observed in September 1922 in the Horns Reef area are caused only by an abnormally slow rate of growth during the summers of 1922 and 1921.

A similar decrease of growth has been demonstrated on the Leman-Haaks line[1] during 1920 and the preceeding years, by comparing the average lengths in age-groups of plaice measured in 1905—1906 and in 1920.

IV. Sex.

a. Proportion of the two sexes in September 1922.

In Table 10 the percentages of females in the catches are given for the various areas and for each age-group, except the 0-group. The table is calculated from the 'Tables of Measurements A' by adding together the individuals caught per hour at all stations and determining the percentage of females contained in the sum. In these tables the otolith- and the sex-determinations are not carried out for all individuals of a sample. For some of the specimens, the length only is determined and the determination of age and sex is reached by calculation. The calculation of the standard deviations given in Table 10 is based on the theoretical standard deviation of a determination of sex for a single individual, and in the further calculation it has been exactly taken into account whether in each individual the sex was actually determined or whether the sex-determinalion was the result of calculation.

[1] J. O. Borley 1923, pp. 28—29.

Table 10. The Percentage of Female Plaice (with standard deviation) in each Age-Group for Areas. Sept. 1922.

Age-Group	I	II	III	IV	I—VII
Area	per cent ± S. D.	per cent ± S. D.	per cent ± S. D.	per cent ± S. D.	per cent ± S. D.
A_a	46.5 ± 2.7	55.5 ± 2.0	62.0 ± 4.0	58.1 ± 6.5	52.9 ± 1.5
A_b	50.2 ± 4.6	52.6 ± 3.8	47.5 ± 10.3	..	50.9 ± 2.8
B_a	50.7 ± 3.5	48.0 ± 2.3	55.4 ± 3.0	56.9 ± 7.6	49.6 ± 1.8
B_b	..	42.7 ± 6.6	45.4 ± 4.4	51.4 ± 8.4	45.4 ± 3.2
B_c	28.5 ± 6.9	45.5 ± 2.7	50.5 ± 3.3	52.1 ± 6.1	45.4 ± 2.0
C	..	17.2 ± 9.3	31.6 ± 7.4	31.6 ± 11.2	30.5 ± 5.2
Total Area investigated	47.8 ± 2.0	50.8 ± 1.4	52.9 ± 1.8	52.8 ± 3.5	50.2 ± 1.0

Looking first at the southern area, consisting of A_a, B_a, B_b and C, we notice for each of the age-groups II, III, and IV, a distinct decrease in the percentage of females from A_a through B_a and B_b to C.

For the II-group the difference between the values for A_a and B_a is 7.5 ± 3.0
„ „ „ „ „ „ „ „ „ B_a „ C „ 30.8 ± 9.5
„ „ III-group „ „ „ „ „ „ A_a „ B_b „ 16.5 ± 5.9
„ „ „ „ „ „ „ „ „ B_a „ C „ 23.8 ± 8.0
„ „ IV-group „ „ „ „ „ „ A_a „ C „ 26.5 ± 12.9

For the I-group, the percentage of females is larger in B_a than in A_a, but the difference is only 4.2 ± 4.4, and for all the plaice older than one year there is a marked decrease in the relative frequencies of females as one passes from the coastal grounds to C.

In the northern area consisting of A_b and B_c, which is less densely populated, and from which we therefore have fewer observations, it is possible for the I-group only to point out a decided decrease in the relative number of females from A_b to B_c. The difference here is 21.7 ± 8.3. But only for the III-group the difference has the opposite sign, and it only amounts to $\frac{1}{3}$ its standard deviation.

There is therefore no doubt that, for each of the age-groups I—IV, the relative frequency of females in the Horns Reef area on the whole decreases from the coastal waters seawards. In many cases the standard deviations of the percentages of females found at the single stations are so great that the seaward decrease of females is concealed, still the chart Fig. 6 showing the percentages of females contained in the II-group illustrates the case very well, except for the four most southern stations, for which the standard deviations are all greater than 7.

A relative decrease of females from the area A_3 to B_4 has previously been pointed out from the English investigations in 1906[1], but in these an increase was observed from B_4 to C_2. Our investigations in September 1922 cover, however, only a small part of the eastern C_2, so that they are not even sufficient to demonstrate whether an increase of females is found east of the Dogger Bank.

Considering the frequencies for different age-groups in the same area, we notice an increase in the relative frequency of females with increasing age. Only three values in Table 10 (A_a, IV; A_b, III; B_a, I) violate this rule, and they do not differ from their neighbouring values by more than 0.6 times the standard deviation of the difference. As examples of differences particularly large in proportion to their standard deviations, the following may be mentioned:

A_a: II-gr.— I-gr. 9.0 ± 3.4
B_a: III-gr.—II-gr. 7.4 ± 3.8
B_c: IV-gr.— I-gr. 23.6 ± 9.2

[1] A. T. Masterman 1911, p. 44.

Also when we consider the total area investigated, we find a slightly larger relative number of females in the III- and IV-groups than in the I- and II-groups, but only the difference between the frequencies for I- and III-gr. approaches as much as twice its standard deviation.

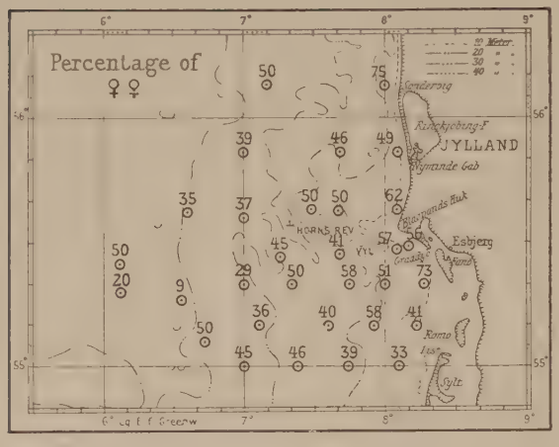

Fig. 6. Showing for the II-group the percentage of females.

As the stations are most numerous in A_a and B_a, where the females are relatively more frequent than in B_b, B_c, and C, and as it must be supposed that of the III- and IV-groups more males than females have emigrated from the investigated area into deeper waters, it is certainly not advisable to take the figures of Table 10 as any evidence at all that the females of the total age-groups I—IV have an increasing relative frequency with increasing age.

The simplest explanation of the numerical distribution found for males and females appears to be this, that the males of every age-group migrate further seawards than the females, and this accounts for the facts observed, firstly, that for each age-group there is to be found a decreasing percentage of females when passing from the coast seawards and, secondly, that, at any given place, the percentage of females of the eldest age-group found at the place, is larger than for the eldest but one, and that the percentage is always decreasing with decreasing age.

That the males should migrate further out than the females is to be expected in the age-groups which are maturing and contain a greater percentage of mature males than of mature females. But all the individuals here examined seemed immature[1], and even if we could imagine that the gradation of the percentage of females for the III- and IV-groups was produced by the emigration of a surplus of mature males westwards out of the area investigated, this explanation would not hold good in the case of the II-group, of which certainly no individual has attained maturity, and which is hardly met with on deeper grounds than those investigated here. We must therefore assume that even before maturity is reached males of the young age-groups have a greater inclination, to leave the coastal grounds than females of the same age.

It will be noticed from the charts of the II- and III-groups in Fig. 5 that, comparing the average lengths of females and males of a station, the females are as a rule somewhat larger than males of the same age-group. The same impression is given by Table 5, when comparing the average length of females and males for areas. It is, however, doubtful whether in the case of these young age-groups, it is indicative

Table 11. Average Length for Males and Females south and north of Horns Reef. Sept. 1922.

Area	$A_a + B_a + B_b + C$			$A_b + B_c$		
	Length cm			Length cm		
Sex	♂	♀	♂+♀	♂	♀	♂+♀
Age-group						
I	12.5	12.6	12.5	15.2	14.9	15.1
II	14.9	14.9	14.9	19.1	19.3	19.2
III	19.3	19.3	19.3	23.8	23.8	23.8
IV	22.0	22.1	22.0	26.6	24.8	25.8

[1] It is hardly possible in all cases, so early as in September, to state whether an individual will reach maturity in the approaching period of spawning or not.

of a quicker rate of growth in the females than in the males. When the larger individuals of an age-group emigrate first and when on the whole the males migrate earlier than the females, it follows, supposing equal growth for the two sexes, that at each given place the average length is greater for females than for males. Nor do we, by grouping together, in each of the two areas $(A_a + B_a + B_b + C)$ and $(A_b + B_c)$, all individuals of the same sex and the same age-group, find any superiority in the females as regards length (See Table 11).

b. Proportion of the two sexes as found from the Danish observations in the years 1903, 1905, and 1907.

The Tables 12 and 13 represent the relative frequencies of females as found from the previous Danish observations resulting from catches taken in otter-trawl. The standard deviations given are theoretical. A comparison of the two tables seems to show that the two sexes are represented in different proportions

Table 12. The Proportion of Female Plaice among Individuals older than one Year. September 1903 and 1905.

Fishing-gear: Otter-trawl.

Area	Year	Depth m	Percent. of ♀♀ ± S. D.	Total number observed ♂+♀
A_a [1]	1905	5—8	64.6 ± 2.2	474
A_b [1]	1905	6—11	58.1 ± 1.7	848
A_b [2]	1903	13—21	62.3 ± 0.9	3145
B_a [1]	1905	20—24	57.8 ± 1.7	806
C [1]	1905	45—54	56.5 ± 2.8	308

[1] See A. C. Johansen 1910, Tab. 52, 58, 66, and 70.
[2] See A. C. Johansen 1905, p. 8. St. 81 and 82.

in the spring and in the early autumn. The percentages of females, for the areas A_a, A_b, and B_a, are 12 ± 3, 15 ± 2, and 20 ± 2, larger, respectively, in September of 1903 and 1905 than in the spring of 1903

Table 13. The Proportion of Female Plaice among Individuals older than one Year. 7.—11. April 1903 and 27. April—7. May. 1907.

Fishing-gear: Otter-trawl.

Area	Year	Depth m	Percent. of ♀♀ ± S. D.	Total number observed ♂+♀
A_a [1]	1907	13—18	52.6 ± 1.4	1296
A_b [1]	1907	8—32	47.1 ± 1.2	1740
A_b [2]	1903	11—13	46.0 ± 2.0	643
B_a [2]	1903	19—21	38.3 ± 1.5	1081

[1] See A. C. Johansen 1910 Tab. 54, 60–65, and 67–68.
[2] See A. C. Johansen 1905 p. 8. St. 38–39, and 41.

and 1907[1]. In both of the tables the females, as found in September 1922, are relatively more frequent in A_a than in B_a. The observations from the years 1903, 1905 and 1907 thus show that, for all the plaice older than one year, the females decrease in relative frequency from the coast seawards, and that the females in all parts of the area investigated are in the majority in Sep-

[1] The English observations (mentioned on p. 17) from May—July 1906 gave for the relative frequency of females in $(A_a + A_b)$ 53.6 ± 1.8 and in $(B_a + B_c)$ 47.1 ± 1.9. These values lie between the values here found for April—May and September.

tember whilst they are, on the whole, relatively less frequent in April—May[1]. This harmonises well with the fact that, in spring, there is a coastwards migration of plaice. As the relative frequency of males is greater in the deeper waters than nearer to the coast, we must expect the migration in spring to produce a rise in the percentage of males which will disappear again during the summer because of the seaward migration.

c. Has the relative frequency of the sexes altered?

Comparing now the Tables 12 and 13 with Table 10 we notice that the percentage of females from the spring of 1903 and of 1907 agrees approximately with that found in September 1922, and that the percentage of females observed in September 1903 and 1905 shows the following deviations from the values for September 1922:

A_a	A_b	B_a	C
12 ± 3	11 ± 3	8 ± 2	26 ± 6

Hence these observations from the Horns Reef area point towards the assumption that the relative frequency of the two sexes has altered in such a way that the females, which among individuals older than one year were, in September 1903 and 1905, in a considerable majority, are, in September 1922, in a decided majority in A_a only, and in a distinct minority in B_c and C. The plaice considered belong particularly to the age-groups I—IV.

German observations of plaice from the south-eastern North Sea also point to a decreased relative frequency of females after the War, as mentioned by HENKING[2] in a recent paper. The following table has been calculated from the tables of observations[3] published in that paper.

Table 14. Percentage of Females among Plaice caught by German Vessels in Area B_4.

Year	1909		1919	
	Percentage	Total number examined	Percentage	Total number examined
Total year	55.8	137,018	33.5	70,907
April—May	50.5	32,585	31.6	22,501
Sept.—Oct.	53.6	15,951	44.4	4,155

The difference between the percentages for 1909 and 1919 is very marked especially for the spring. We further notice that the females are relatively more frequent in the autumn than in the spring, as found from Danish investigations under b of this section. This supports the assumption that the observation of an equal relative frequency of females in the springs of 1903 and 1907 and in September of 1922 may agree with a general relative decrease of females.

From the lengths of the plaice[4] it may be seen that the plaice from 1919 hardly contain any specimens of the I- and II-groups and that in several months, among the first six of the year, they include

[1] But the nature of a sample taken on 5th of May 1923 near St. 2815 warns us not to be too sure about a different sex distribution for spring and autumn. The sample caught consisted of 10092 individuals, of which 1200 specimens of lengths from about 20—28 cm were selected for special use. Amongst the remainder, 4692 specimens taken at random were measured, and the sex determined of those larger than 10 cm. They were 1864 males and 2527 females. The percentage of females among these is accordingly 57.5 ± 0.7, which is the same as that found for St. 2815 in September 1922, although in all probability we have, by omitting the larger individuals, lowered the percentage of females rather than raised it. This sample therefore gave no indication of a smaller relative frequency of females in May, but we must attach less importance to this single sample than to the result obtained from Tables 12 and 13, in which the figures for the various samples support each other.

[2] H. HENKING 1922, p. 83.

[3] l. c. Tab. 3—4.

[4] Compare l. c. Table 3—4.

a considerable percentage of older plaice of more than 40 centimetres in length. Just during these months the percentage of females is particularly small, from which we infer that the increased percentage of males is found at least as much among the older as among the younger age-groups.

English investigations of plaice from the southern North Sea carried out during the years 1920 and 1921 [1] also bear evidence of an increased percentage of males as compared with pre-war values especially in the V-group and older age-groups.

Thus we have found evidence of an increased percentage of males from three different groups of post-war observations. For the Horns Reef area the increase seems to occur already in the II-group [2] in September 1922, but in the English and German materials the evidence of increase is clearest for the older age-groups.

It is difficult to imagine a single explanation which may be valid for all the age-groups from the II-group upwards, but we shall discuss various possibilities.

Before the War there was obviously in the total stock of the North Sea a distinct decrease in the percentage of male plaice, when passing from the age-group in which the majority of males become mature to older age-groups, but whether this greater mortality of males than of females was due to fishery or to 'natural' causes has not been fully demonstrated.

It has been pointed out by HEFFORD [3] that on the spawning grounds, where the males are accustomed to gather in large shoals during the spawning seasons and stay for several weeks, whereas the females occur more scattered and remain for a shorter time only, the males are much more affected by fishery than the females, and Hefford is therefore inclined to ascribe the sharp decline of mature males to a high intensity of fishing in the spawning season.

Let us consider this possibility that the fishery before the War was carried on in such a way that the mature males were more persecuted than females of the same age. If this be so, the restricted fishing during the war, even if it had taken place on the same grounds as formerly, would tend to diminish the difference of frequencies between mature males and females. As actually the fishing was particularly restricted on the spawning grounds of the southern and south-eastern North Sea, because of the mining fields, this tendency would be so much stronger.

Thus it is in good agreement with the above theory of HEFFORD that the males from the age at which the majority of males become mature should be relatively more frequent after than before the War. But this theory does not explain why the males of less than five years should in post-war years be relatively more frequent than before the War, and this is what the Danish observations in the Horns Reef area appear to show.

It was demonstrated under 'a' of this section that there was in September 1922 a decreasing percentage of females in each age-group, when passing from the cost seawards, and this was explained by supposing that the males migrated earlier than the females. As the plaice at a given age are now on an average smaller than formerly and as maturity in all probability is reached later [4], it is to be expected that the segregation of males and females does also occur at a higher age now than formerly. If this be so, the relative decrease of females in the Horns Reef grounds found in September 1922, as compared with

[1] J. O. BORLEY 1923, Table 31.

[2] Compare Table 10 with A. C. JOHANSEN 1910, Tab. 58, 66, and 70.

[3] A. E. HEFFORD 1916, p. 39.

[4] Although it is not possible in September to decide with certainty whether an individual will become mature in the next spawning-period, the judgments made about maturity are valuable when compared with observations made at the same season. In Septemher 1905 the following percentages of male individuals from the Horns Reef area were indicated as being mature:

II-group	III-group	IV-group	V-group	calculated from Tables 57, 58, 66, and 70 of A. C. JOHANSEN 1910.
14 ± 3	11 ± 3	23 ± 6	56 ± 18	

When in September 1922, all males were judged to be immature, there is not much doubt that maturity is now attained at a higher age than formerly.

Table 15. Frequencies of Lengths per 1000 of Plaice for each of the International Areas. Sept. 23.—Nov. 10. 1922. (From landings in Esbjerg).

Area	A_3	B_1	B_4	B_5	C_2	D_2
Period of sampling	Oct. 5. —Nov. 10.	Oct. 1.—24.	Sept. 23. —Nov. 10.	Oct. 4.—30.	Sept. 23. —Oct. 20.	Oct. 1.—19.
Number of samples	16	20	145	44	18	3
Average depth m	16	35	28	29	49	55
Length cm						
21	4	..	..	..	..	..
22	78	..	28	10	..	..
23	138	..	89	39	3	..
24	196	..	168	119	20	..
25	207	..	176	172	62	..
26	159	..	175	187	104	..
27	101	7	137	165	131	..
28	62	11	100	116	108	..
29	30	21	63	80	102	..
30	15	22	31	42	76	..
31	4	22	16	26	48	..
32	3	29	8	18	46	..
33	2	21	4	12	32	10
34	0.5	31	3	6	26	..
35	..	34	1	4	19	19
36	..	68	1.2	1	15	19
37	0.5	65	0.2	2	9	58
38	..	72	0.2	1	13	49
39	..	65	0	0.4	7	58
40	..	51	..	..	13	49
41	..	25	..	0.2	11	29
42	..	31	..	..	8	19
43	..	48	..	..	13	49
44	..	37	..	..	11	78
45	..	20	..	..	13	58
46	..	29	..	..	13	39
47	..	32	..	..	13	68
48	..	25	..1	..	13	87
49	..	24	0	..	5	39
50	..	62	..	..	21	49
51	..	30	..	..	10	29
52	..	36	..	..	10	58
53	..	29	..	..	10	39
54	..	12	..	..	2	29
55	..	17	..	..	4	10
56	..	1	..	..	1	..
57	..	1	..	..	..	..
58	..	2	..	..	..	10
59	..	..	..	..	1	..
60	..	12	..	..	7	49
61	..	1	..	..	..	..
62	..	2	..	..	..	..
63	..	1	..	..	1	..
64	..	..	..	..	..	..
65	..	1	..	..	1	..
66	..	..	..	..	..	..
67	..	..	..	..	1	..
under 27	783	0	635	527	189	0
over 30	24	960	64	112	471	1000
Average length[1] cm	25.08	41.66	25.97	26.70	32.33	45.71
Total numb. measured	2058	805	14031	4845	1358	103

[1] Not corrected by 0.5.

September 1903 and 1905, can be explained naturally by a different local distribution of males and females in the two periods, and there is no basis for assuming a different relative frequency of males and females in the total age-groups.

V. Investigations of marketable plaice landed in Esbjerg.

During the period from Sept. 23rd to November 10th of 1922 measurements of 247 samples of marketable plaice landed in Esbjerg were carried out, and the measurements are recorded in Table of Measurements B. The size limit for sale in Denmark is 25.7 cm for the total length. For plaice landed for export the size-limit was from Oct. 1. 22.5 cm and in September 24.0 cm. Plaice under these sizes are therefore thrown overboard directly after the capture, but otherwise the catches sampled are not sorted for sale.

More than half of the samples are taken from catches arising from the area B_4, and moreover these catches are all from the part of B_4 situated north of Horns Reef, which we have named B_c. These samples contain on an average 110 individuals. Samples from C_2, B_1 and D_2, where the plaice were larger and less numerous, contain only 30—40 plaice. The total number of plaice measured is 23,299.

a. Frequencies of lengths in the areas B_4 and B_5.

In Table 15 a survey is given of the frequency distribution, according to length, per 1000 plaice

Table 16. Number of Individuals under 27 cm in length among 1000 Plaice landed in Esbjerg.

Area	B_4				B_5	
Period of sampling	Sept—Nov. 1904 & 1905	Aug. 1919	Sept. 1919	Sept.—Nov. 1922	July—Sept. 1904 & 1905	Octbr. 1922
Average depth of fishing place m	25	22	22	28	24	29
Number of plaice under 27 cm pr. 1000	274	347	334	635	372	527
Total number of plaice measured	2399	7638	4753	14031	2141	4845

from each of the international areas fished. By comparing the figures for B_4 in this table with measurements undertaken in the autumn of 1905[1] and in August and September[2] of 1919 it is seen at a glance, that the samples from 1922 contain proportionately many more small plaice than the other samples. In Table 16 the number of plaice under 27 cm per 1000 individuals are given, and it will be seen that, although the fishing in 1922 took place generally on deeper grounds and north of Horns Reef, the catches contain about double the number of these small fish as compared with the samples considered from 1904—1905 and 1919. However when these samples were taken, the size limit was 24—26, and the bulk of the samples from 1922 were taken after October when the size-limit for export was only 22.5. Although we do not notice any decrease in the average length of the plaice from September to October 1922, there is the possibility that, on the whole, the sorting has altered together with the size-limit. We shall therefore compare the distribution of length for plaice over 27 cm, which cannot be essentially affected by the difference of size-limit. Table 17 gives the numerical distribution of such fish among three length-groups for the areas B_4 and B_5. The frequencies per 1000 have first been calculated for each sample, and then the average has been found for the group of samples in question, by which proceeding we have been able to determine the empirical St. D given in the table.

Table 17. Distribution of 1000 Plaice over 27 cm among three length groups. (From landings in Esbjerg).

Area	B_4				B_5	
Period of sampling	Sept.—Nov. 1904 & 1905	Aug. 1919	Sept. 1919	Sept.—Nov. 1922	July—Sept. 1904 & 1905	Octbr. 1922
Number of samples	24	67	42	145	21	44
Average depth of fishing-places in m	25	22	22	28	24	29
Length-group	‰ ± St. D.	‰ ± St. D.	‰ ± St. D.	‰ ± St. D.	‰ ± St. D.	‰ ± St. D.
under 30 cm	593 ± 37	604 ± 18	580 ± 22	829 ± 7	758 ± 30	784 ± 27
between 30 and 33 cm	287 ± 26	263 ± 11	286 ± 11	147 ± 6	201 ± 24	171 ± 17
over 33 cm	120 ± 17	133 ± 12	133 ± 15	25 ± 3	41 ± 11	55 ± 11

It will be seen from the table, that the samples from B_4 and B_5 taken in 1922 show approximately the same distribution, those from B_5 being only somewhat more abundant in plaice over 33 cm. The distribution found for 1922 does not deviate essentially from that found for the samples from B_5 in 1904—1905. But the samples from B_4 taken in 1904—1905 and 1919 contain a considerably greater percentage of plaice larger than 30 cm. Now it was found previously[3] that quite extraordinary catches in September of 1905 were landed from B_4, which, as compared with the ordinary catches at that time and from that

[1] A. C. Johansen 1910, p. 41.
[2] K. Smith 1921, p. 20.
[3] K. Smith 1921, p. 21.

Table 18. Distribution of 1000 Plaice from C_2 according to length. (From landings in Esbjerg).

Area	C_2, e L_8, L_9, L_{10}, K_9,, and K_{10}			C_2, n. w. G_{10}, H_{10}, K_{11}, and K_{12}
Period of sampling	July—Sept. 1916	July—Sept. 1919	Sept.—Oct. 1922	Oct. 1922
Number of samples	26	16	10	8
Average depth of fishing-place	46	45	48	51
Length cm				
23	..	..	4	..
24	..	1	25	..
25	27	2	77	..
26	54	7	129	..
27	67	21	162	..
28	91	19	133	..
29	95	27	127	..
30	90	32	92	8
31	99	51	58	4
32	95	42	57	..
33	73	54	37	11
34	66	62	27	19
35	49	67	17	27
36	36	58	12	31
37	27	41	5	23
38	22	61	5	46
39	18	23	4	23
40	18	54	5	46
41	20	37	4	42
42	9	38	1	38
43	6	34	4	54
44	11	42	..	57
45	6	28	2	61
46	7	27	3	54
47	4	33	2	57
48	5	29	2	57
49	2	18	2	19
50	1	31	..	111
51	..	11	3	38
52	..	16	2	46
53	1	9	..	50
54	..	11	..	11
55	1	4	..	19
56	1	4	..	4
57	..	2	..	..
58	..	..	..	..
59	..	2	..	4
60	..	..	..	27
61	..	..	..	..
62	..	..	..	..
63	..	..	..	4
64	..	..	..	..
65	..	..	..	4
66	..	..	..	..
67	..	..	..	4
Total number measured	1709	1308	1097	261
Average length[1] in cm	32.15	38.78	29.18	45.56

[1] Not corrected by 0.5.

region, consisted of unusually large fish. Among the 24 samples of the first column of Table 17, 8 have arisen from such catches and the remaining 16 samples give the following percentages:

Under 30 cm.	69.4
Between 30 and 33 cm.	22.1
Over 33 cm.	8.5

It will be noticed that each percentage value lies between the corresponding percentages for 1919 and for 1922.

We arrive therefore at the following conclusion: The measurements of marketable plaice from B_4 prove that the percentage of plaice over 30 cm, contained in the stock of plaice over 27 cm in October 1922, is considerably below that found in August and September 1919 and also smaller than in September to November 1904—1905. From B_5 we also find a higher percentage in 1922 of plaice smaller than 27 cm than in 1904—1905, but this may be due to different sorting, since for plaice larger than 27 cm the distribution among size-groups is essentially the same during these two periods of sampling.

b. Frequencies of lengths in the areas C_2, B_1, and D_2.

The samples of plaice from the areas B_1 and D_2 are not at all, and those from C_2 very little, influenced by sorting, and can therefore be compared directly with samples taken when the size-limit was different from that in October 1922.

A study of the samples from C_2 in the "Table of Measurements B", shows that the distribution of

length and the average length of the samples differ considerably according to whether the fishing-place is situated in the areas L_9, K_9, and K_{10}, i. e. east of the Dogger Bank, which we shall name $C_{2,\,e}$, or in the areas G_{10}, H_{10}, K_{11}, and K_{12}, i. e. northwest and north of the northeastern part of the bank, which we shall designate $C_{2,\,n.\,w.}$ In the latter areas the plaice are much larger than in the former and also larger than in the part of the Dogger Bank sampled in 1922, i. e. the northeastern part of the bank. Because the Danish measurements of plaice previously carried out in C_2 deal only with samples from $C_{2,\,e}$ we shall, in Table 18, consider the two parts of C_2 separately and compare with the previous measurements taken in 1916[1] and 1919[2].

When comparing the separate samples from the periods of measurements in 1916 and 1919, no seasonal variation in the length of the plaice can be traced during July—Sept., so we may regard them as suitable for comparison with the samples from 1922, of which nine have been taken in September. The table therefore shows that the great relative frequency of large plaice over 35—40 cm observed in 1919, as compared with 1916, has entirely vanished from $C_{2,\,e}$ in 1922, when the smaller sizes of plaice are on the contrary proportionately more frequent than in 1916.

Table 19. Average Length of Plaice with empiric Standard Deviations. (From landings in Esbjerg).

Area	$C_{2,\,e}$			B_1	$C_{2,\,n.\,w.}$
Period of sampling	July—Sept. 1916	July—Sept. 1919	Sept.—Oct. 1922	Oct.—Nov. 1922	Oct. 1922
Number of samples	26	16	10	20	8
Average length	33.0 ± 0.4	39.8 ± 1.2	29.8 ± 0.3	44.0 ± 1.1	46.5 ± 1.0

From Table 19, in which the average length is calculated as the mean value of the average length found for each sample equally weighted, and in which the standard deviation is calculated from the empiric standard deviation for means of samples, we gain some idea of the reliability of the results. It will be noticed that there is a systematic difference between the average lengths given in Tables 18 and 19, owing to the different principle of calculation. The means of Table 18 are the average values for all plaice measured from an area, while those of Table 19 are the average values for means of sample of approximately equal weight. It follows from this, that the samples with greater average length contain a smaller number of individuals, and therefore the averages of Table 19, where the same weight is given to each sample, must be greater than the corresponding averages of Table 18 calculated for the whole collection of individuals from one area. The difference between the two average values is approximately the same for each group of samples, and the St. D.'s given in Table 19 show that the differences between the average lengths in $C_{2,\,e}$ in 1916, 1919, and 1922 are all significant.

It is, however, further seen from Table 19 that moving from area $C_{2,\,e}$ in north-westerly direction we find in the neighbouring areas B_1 and $C_{2,\,n.\,w.}$ in 1922 plaice the average length of which is decidedly above even that found for $C_{2,\,e}$ in 1919, the deviations from this value being 4.2 ± 1.6 and 6.7 ± 1.5 respectively. It is therefore possible that the decrease of average length observed in $C_{2,\,e}$ is partly due to a different local distribution of the plaice in the autumn of 1922 as compared with the periods of observation in 1919 and 1916.

c. Frequency of lengths in the area A_3.

The samples from A_3 contain a still greater percentage of small plaice than those from B_4. (See Table 15). We have, for comparison, no samples taken in the month of October in previous years, but

[1] Johansen and Smith 1919, pp. 32—33.

[2] Smith 1921, pp. 46—47.

compared with samples taken in September of the years 1904—1905 and 1919[1] we again find that the samples from Oct.—Nov. 1922 consist of unusually small fish, the number of plaice under 27 cm being 783, whereas it was only 440 and 309 respectively during the periods of sampling mentioned. This might perhaps be due partly to the small size-limit in force, and we must examine the distribution according

Table 20. Distribution of 100 Plaice over 27 cm in length according to length. Area A_3. (Landings in Esbjerg).

Period of sampling	Sept. 1904—1905	Sept. 1919	Oct.—Nov. 1922
Number of samples	8	136	16
Average depth of fishing-place in m	16.5	16.5	16.5
Length cm	Freq. ± St. D.	Freq. ± St. D.	Freq. ± St. D
27	37 ± 4	22 ± 1	51 ± 3
28	26 ± 2	18 ± 1	26 ± 3
29	16 ± 2	14 ± 0 5	15 ± 2
30	11 ± 2	12 ± 0.4	5 ± 1
31	4 ± 1	9 ± 0.3	0.8 ± 0.6
32	3 ± 1	7 ± 0.3	0.8 ± 0.5
over 33	4 ± 4	19 ± 1	0.7 ± 0.4

to length of the plaice over 27 cm. Table 20 represents the distributions of 100 plaice over 27 cm. It will be seen that there is a distinct difference between 1919 and 1922 in the distribution of the plaice over 27 cm, the sizes 27—29 cm being abundantly represented in 1922 as compared with 1919; on the other hand, plaice over 33 cm amounted in 1919 to 19 per cent against only 0.7 per cent in 1922. Compared with the samples from 1904—1905, those from 1922 contain a greater percentage of the length 27 cm and a smaller percentage of the lengths over 29, but the differences are less pronounced.

Thus for both of the areas B_4 and A_3 we have found that, comparing plaice over 27 cm, the frequency distribution of which can be considered independent of the different size-limits, the size-group over 30 cm in 1922 represents a much smaller percentage of the total number than in 1919 and a somewhat smaller percentage than in 1904—1905. When it is so, it is probable that the relative abundance of plaice under 27 cm found in 1922 is not due solely to the smaller size-limit in force, but is a sign of a greater relative frequency of this size-group in the unsorted catches.

d. Age of the marketable plaice in B_c in the autumn of 1922.

We shall make an attempt at calculating, by means of the fishing experiments undertaken in September 1922, the age-composition of the marketable plaice from B_c captured in the autumn of 1922. Starting with the sum of plaice caught per hour at each of the stations in B_c we assume that plaice over 27 cm are unaffected by sorting, and that the frequencies for size-groups under 27 cm have been reduced so much that their proportion to the total number over 27 cm is the same as that found for B_4 in Table 15. We thus arrive at the distribution given in Table 21. It will be seen that 53% of the market plaice belong to the III-group, 22% to the II-group, 21% to the IV-group, and the remaining 4% to the V-group. When the marketable plaice are so young it is clear that their average length and, on the whole, their distribution according to length, depends very much upon the growth rate during the last two periods of growth.

For the spring of 1922 we have a sample of marketable plaice from the deeper part of B_a, examined as to otoliths (Table 22). About half of the plaice are four years old, about one fifth three years, and as many five years. They are of about the same age as the marketable plaice found in B_a and B_b in

[1] See K. Smith 1921, Table 9 and Table 10 pp. 13—14.

Table 21. Distribution of 1000 Marketable Plaice from the Area B_c (B_4),
calculated on the basis of the fishing experiments in September 1922 by performing a sorting as indicated by the measurements of marketable plaice.

Age-group	II		III		IV		V		Total		
Length cm	♂	♀	♂	♀	♂	♀	♂	♀	♂	♀	♂+♀
22	10	6	6	5	0.3	1.0	..	..	16	12	28
23	24	16	23	22	1.5	3	..	..	49	41	90
24	24	25	32	54	6	23	..	4	62	106	168
25	14	38	62	47	9	7	..	..	85	92	177
26	15	16	53	48	20	18	4	..	92	82	174
27	16	8	44	32	25	8	8	8	93	56	149
28	8	4	24	31	25	9	..	4	57	48	105
29	..	..	15	7	11	8	..	4	26	19	45
30	..	..	4	12	8	12	..	3	12	27	39
31	..	..	..	..	4	..	..	..	4	..	4
32	..	..	..	..	7	..	..	4	7	4	11
33	..	..	..	4	..	..	..	..	..	4	4
34	..	..	..	8	4	..	..	..	4	8	12
Total	111	113	263	270	121	89	12	27	507	499	1006

the autumn of 1922, (see Table 23) having, on an average, passed through 4.2 periods of growths, while those from B_a and B_b had on 1. April passed through on an average 3.8 and 3.6 periods of growth.

Comparing the sample from March 1922 with marketable samples from A_a taken in the spring of

Table 22. Size and Age of Plaice Caught 40 miles WSW of Graa Deep at the depth of 28 m on 28. March 1922.
All specimens immature except those mentioned at the foot of the table.

Sex	♂							♀							♂+♀						
Age-group	II	III	IV	V	VI	?	Total	II	III	IV	V	VI	?	Total	II	III	IV	V	VI	?	Total
Length cm																					
22	..	1	1	..	..	..	2	1	..	..	..	..	..	1	1	1	1	..	..	..	3
23	9	10	..	..	..	..	19	5	2	..	..	..	..	7	14	12	..	..	..	..	26
24	13	24	9	..	..	1	47	15	10	2	..	..	..	27	28	34	11	..	..	1	74
25	4	24[2]	9	2	..	..	39	2	19	8	..	..	..	29	6	43[2]	17	2	..	..	68
26	7	20	10	7	1	..	45	4	18	13	2	..	..	37	11	38	23	9	1	..	82
27	4	17[1]	7	2	1	..	31	4	15	7	2	..	1	29	8	32[1]	14	4	1	1	60
28	1	9	3	4[2]	..	..	17	1	4	7	4	1	..	17	2	13	10	8[2]	1	..	34
29	..	2[1]	3	..	..	..	5	1	6	..	2	..	..	9	1	8[1]	3	2	..	..	14
30	..	..	2	1	..	..	3	..	1	4	..	..	..	5	..	1	6	1	..	..	8
31	..	..	..	..	..	..	..	..	1	1	1	..	..	3	..	1	1	1	..	..	3
Total	38	107	44	16	2	1	208	33	76	42	11	1	1	164	71	183	86	27	3	2	372
Average length[3] cm	24.7	25.4	26.0	26.8	26.5	24.0	25.49	24.7	26.1	26.7	27.9	28.0	27.0	26.10	24.7	25.7	26.3	27.2	27.0	25.5	25.76

[1] One of these possibly mature.
[2] One of these mature.
[3] Not corrected by 0.5.

1919[1] and of 1920[2], we find that it is, on an average, about 1.1 year younger than these. In Sept. 1922 the marketable plaice from A_a is according to Table 23 only 0.5 year older than those from B_a so that we are justified in assuming that the average age of the marketable stock of plaice in the Horns Reef area has decreased after the fishing had been carried on more or less normally for the years following the War.

Accordingly we find two causes why the marketable plaice from B_4 in 1922, as com-

[1] A. C. Johansen and K. Smith 1919, p. 23.
[2] K. Smith 1921, pp. 22—23

pared with 1919, should be smaller: (1) the percentage of the older age-groups contained among the market plaice has diminished as a result of a more normal intensity of fishing after the War, (2) the growth rate has, in 1922, and probably in 1921, been unusually small, so that the length of marketable plaice from each given age-group is smaller presumably than in 1919. The last cause may explain why the market plaice in 1922 were smaller than in 1904—1905.

e. Density of marketable plaice in the autumn of 1922.

To get an idea of the density and the age of marketable plaice in the various areas with which we have worked in Sections II—IV, we shall consider the number of plaice over 24 cm caught per hour in the fishing experiments of September 1922 (see Table 23). From 1. Oct. it is permitted to land plaice over 22.5 in total length, but only a few of the lengths 22 and 23 cm are actually landed, as will be seen

Table 23. Number of Plaice over 24 cm Caught per hour by a 50 feet otter-trawl. September 1922.

(Calculated from the fishing experiments).

Age-group	II	III	IV	V	VI	Total	Average age on 1. April 1922
Area							Years
A_a	0.0	0.1	0.9	0.6	0.0	1.6	4.3
A_b	1,0	1.0	0.6	0.4	0.0	3.0	3.1
B_a	0.0.	2.6	2.1	1.0	0.1	5.9	3.8
B_b	0.6	7.7	4.4	2.1	0.3	15.1	3.6
B_c	11.1	29.2	12.1	2.1	0.0	54.6	3.1
C	0.5	2.4	1.8	0.8	0.2	5.7	3.6

from Table 15. Nor are plaice of 24 cm fully represented in the landings, but by entirely neglecting the plaice under 24 cm, and by counting all the individuals of 24 cm from the fishing experiments, we get a fair approximation to the distribution of marketable plaice among age-groups. It will also be seen that the distribution among age-groups of plaice over 24 cm from B_c, as given in Table 23, agrees pretty well with the distribution of marketable plaice in Table 21 found by the more elaborate method described above.

It appears from Table 23 that the density of marketable plaice in September was extraordinarily great in B_c, the part of B_4 situated north of Horns Reef, the density being 3—4 times as great as in B_b and about 10 times as great as in B_a and in C. The distribution of the marketable samples among the areas (see Table 15), which is approximately indicative of the catches obtained, shows that this comparative abundance in B_c has continued also throughout the month of October.

Comparing Table 23 with Table 1 it will further be seen that this relative abundance of marketable plaice in B_c is chiefly due to the better growth. Comparing in Table 1 the frequencies of an age-group for different areas, in no case do we find the maximum value in the area B_c, but the ratio of marketable plaice in each of the age-groups II—IV to the total number of plaice in an age-group is much greater in B_c than in B_a and B_b, and is only excelled by the corresponding ratios in C. The III-group, which in the areas B_a, B_b, and B_c is the basis of the marketable plaice, is about as frequently represented in B_a and B_b as in B_c, but nevertheless the density of marketable plaice belonging to the III-group is in B_a only about one eleventh and in B_b about one fourth of that in B_c. The II-group, which in B_c contributes essentially to the marketable plaice, is of absolutely no value to the fishery in the areas A_a and B_a, where it is about three times as dense as in B_c.

VI. Marking experiments in the spring of the years 1920 and 1921.

The plaice were marked with a label consisting of a bone button and a brass disc connected by means of a silver wire. The bone button carries another brass disc, in which a number is stamped.

In Fig. 7—13 illustrating the results of the experiments the places of liberation are denoted by a small circle and the places of recapture by a spot for females and an arrow head for males. The two places are connected by a straight line or a curve. The figure near the place of recapture indicates the number of calendar months initiated between liberation aud recapture. The nationality of the vessel by which the plaice has been recaptured is denoted at the place of recapture by putting Da for Danish, E for English, G for German, H for Dutch and Sc for Scottish. Nearly all the plaice have been recaptured by Danish vessels, and the indication 'Da' is therefore omitted except in Fig. 10, which represents the widest migrations.

a. Migrations of marked plaice.

Marking experiment No. 1 (Fig. 7). On the 23rd of April 1920 50 plaice were liberated outside the Graa Deep bar, at 55° 26′ N. Lat., 8° 15′ E. Long. (Depth: 12 m).

Marking experiment No. 2 (Fig. 7). On 23rd of April 1920 110 plaice were liberated west of Fanø, at 55° 25′ N. Lat., 8° 16′ E. Long. (Depth: 10 m).

Marking experiment No. 3 (Fig. 7). On 23rd of April 1920 40 plaice were liberated inside the Graa Deep bar, W. by S. of "Bjælken", at 55° 27′ N. Lat., 8° 17′ E. Long. (Depth: 4 m).

Marking experiment No. 4 (Fig. 8). On 23rd of April 1920 100 plaice were liberated inside the Graa Deep bar, W. by N. of "Bjælken" at 55° 27′ N. Lat., 8° 17′ E. Long. (Depth: 4 m).

Table 24. Showing for each length of liberated plaice the number of plaice liberated and the number of plaice recaptured. Springs of 1920 and 1921.

	23. April 1920				27.—28. May 1920				23. April and 27.—28. May 1920				24. April 1921			
	♂		♀		♂		♀		♂		♀		♂		♀	
	Liber.	Recapt.	Liber.	Recapt.	Liber.	Recapt.	Liber.	Recapt.	Liber.	Recapt.	Liber.	Recapt.	Liber.	Recapt.	Liber.	Recapt.
Length cm																
21	1	1	2	1	..	..	..	..	1	1	2	1	1	..	2	..
22	4	2	4	2	1	..	..	..	5	2	4	2	6	2	6	2
23	11	4	3	1	4	..	2	..	15	4	5	1	21	7	17	9
24	16	4	27	11	12	4	7	2	28	8	34	13	41	18	50	24
25	31	10	56	22	9	4	11	2	40	14	67	24	35	19	39	27
26	33	13	25	16	20	9	13	5	53	22	38	21	34	19	27	15
27	16	8	13	6	24	11	19	7	40	19	32	13	13	10	12	3
28	10	4	13	9	23	13	16	7	33	17	29	16	11	4	10	9
29	4	2	10	6	10	2	12	4	14	4	22	10	5	2	4	2
30	4	..	6	3	3	..	4	3	7	..	10	6	1	..	9	6
31	3	2	4	1	3	..	1	1	6	2	5	2	..	..	2	..
32	..	..	2	..	2	2	2	2	2	2	4	2	1	..	3	2
33	..	..	1	..	1	1	1	..	1	1	2	..	..	..	..	..
34	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
35	..	..	1	..	..	..	..	..	..	..	1	..	..	..	..	..
Total number ..	133	50	167	78	112	46	88	33	245	96	255	111	169	81	181	99
Average length[1] cm	25.71	..	25.98	..	26.87	..	27.09	..	26.24	..	26.36	..	25.12	..	25.36	..

[1] Not corrected by 0.5.

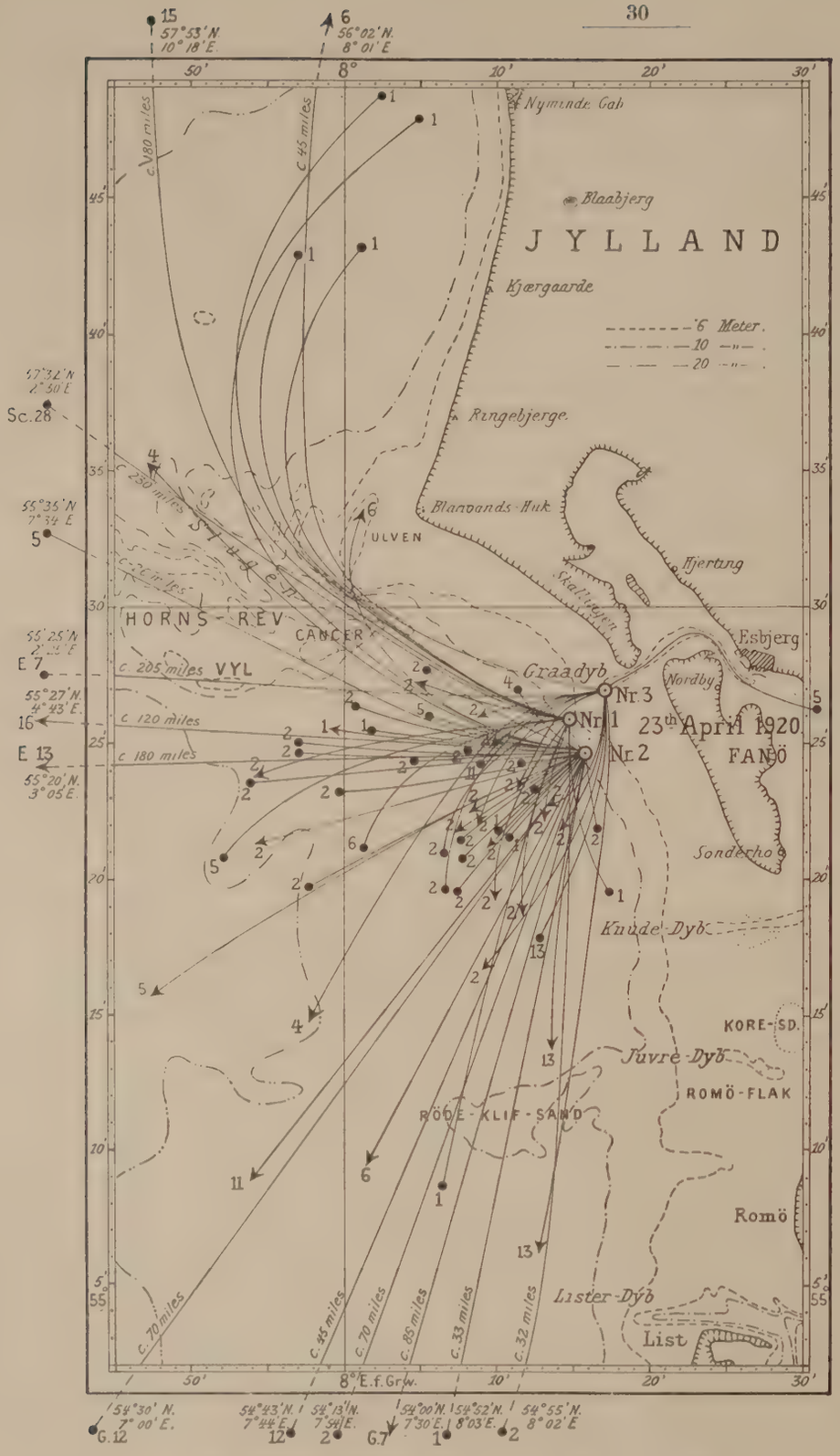

Fig. 7. *Marking experiments with plaice on 23rd of April 1920.*
Females denoted by a spot, males by an arrow head.

In these four marking experiments of 23rd of April 1920, which all took place west of the northern end of the island of Fanø, a total of 300 plaice (133 ♂♂ and 167 ♀♀) were liberated. Before the end of May only 16 specimens (1 ♂ and 15 ♀♀) were recovered; they were all caught in the area A_3, but as seen from the charts (Fig. 7 and 8) at essential greater depths than those of the places of liberation; 10 were caught south of Horns Reef and 5 north of the reef. During June 69 specimens (28 ♂♂ and 41 ♀♀) were recaptured, one north of Horns Reef in B_5, one south of Horns Reef in B_4, one near Helgoland, and the remaining 66 in A_3 south-west of the places of liberation. During July only one specimen was caught (in A_3). During August 10 plaice were recovered, 5 in A_3 and 5 further seaward; during September 8 plaice, of which 3 were caught at greater depths than 20 m and one between Jutland and Fanø. During October only 4 specimens were recaptured and 3 of these in A_3; during November 2 specimens, one in A_3 and one in C_2. In the following two months no recaptures occurred, but during the months February to May inclusive of 1921, 10 specimens (average growth: 6.3 cm) were caught on the Horns Reef grounds between the reef and 54° 30′ N. Lat., and besides these, a male of 29.5 cm (growth: 5 cm) on the Dogger Bank, and a male of 32 cm (growth: 3 cm) in the central part of B_3. During July 1921 a female of 34 cm (growth: 10 cm) was recovered near Hirts-

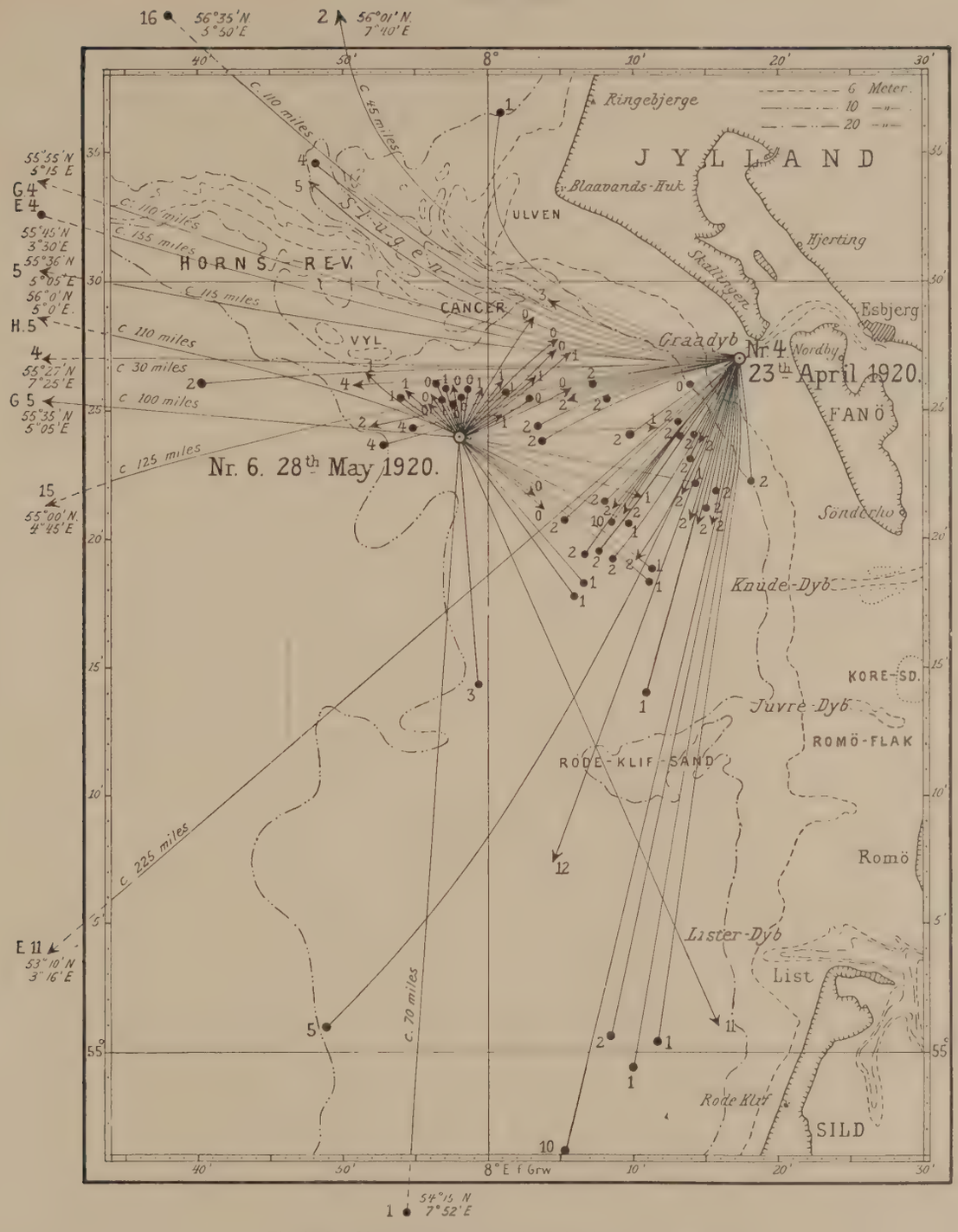

Fig. 8. *Marking experiments with plaice in the spring of 1920.*
Females denoted by a spot, males by an arrow head.

hals and a male of 35 cm (growth: 7 cm) in C_2 east of the Dogger Bank. During August a male of 28 cm (growth: 6 cm) was caught on the Dogger Bank, and a female of 42 cm (growth: 17 cm) north-east of

the north-eastern end of that bank. Between that date and 1st of Oct. 1923 only one more specimen was recovered viz. a female of 42 cm (growth: 15 cm) caught in August 1922 in the western part of D_2.

It will be seen from this account that the positions of the places of recapture during June, July, and August 1920 confirm the previous evidence of an off-coast migration during the summer. During

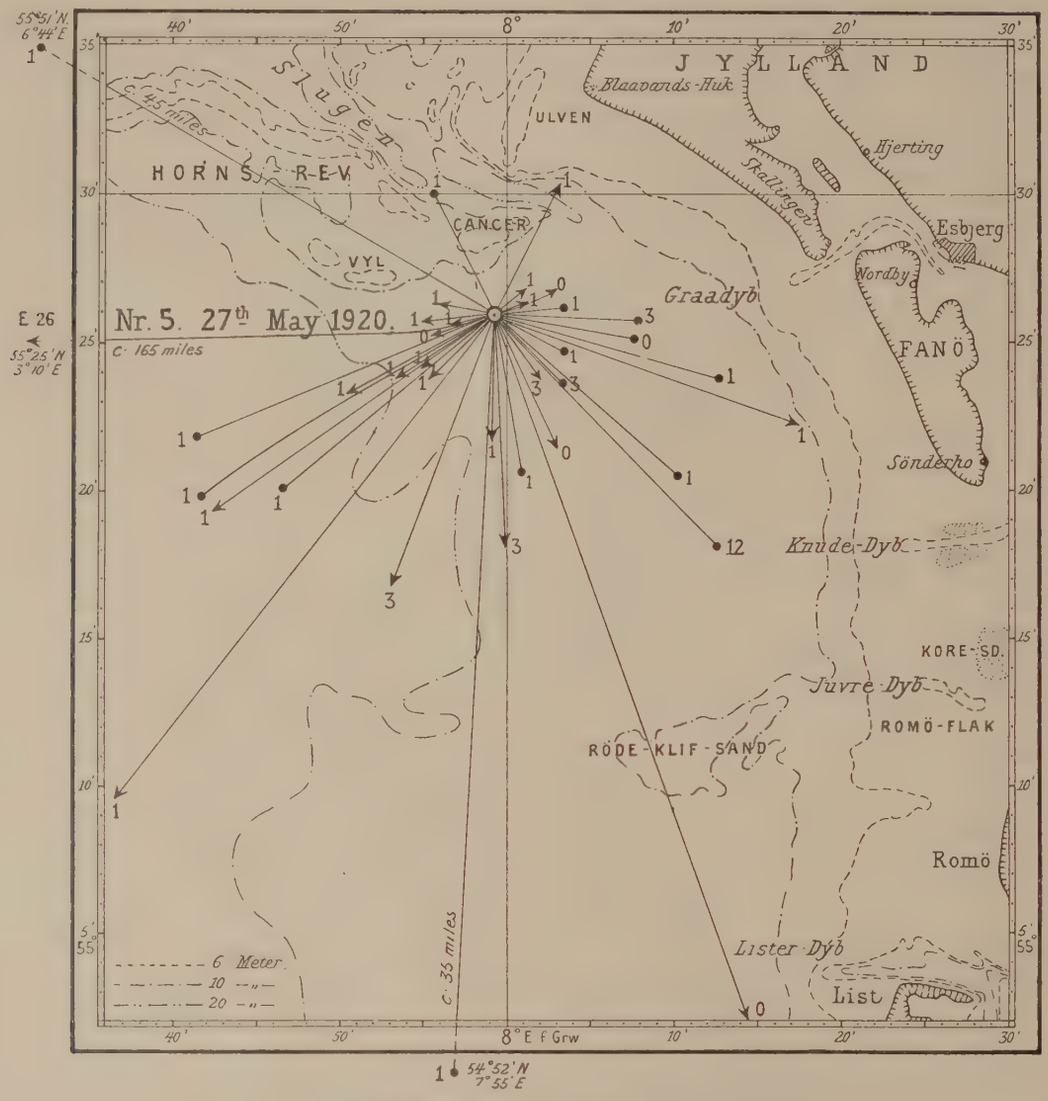

Fig. 9. *Marking experiment with plaice on 27th of May 1920.*
Females denoted by a spot, males by an arrow head.

February to May of the year 1921, nearly all the recaptures occur once more on the Horns Reef grounds and thus indicate that an essential portion of the marked plaice are again present on the coastal grounds.

Marking experiment No. 5 (Fig. 9). On 27th of May 1920 100 plaice were liberated south of Horns Reef at 55° 26′ N. Lat., 7° 59′ E. Long. (Depth: 15 m).

Marking experiment No. 6 (Fig. 8). On 28th of May 1920 100 plaice were liberated south of Horns Reef, at 55° 24′ N. Lat., 7° 58′ E. Long. (Depth: 15.5 m).

Of the 200 plaice (112 ♂♂ and 88 ♀♀) liberated in these two experiments of 27th and 28th of May 1920 66 (37 ♂♂ and 29 ♀♀) were recaptured before the end of June. The positions of the places of recapture, as seen from the charts, indicate a general spreading of the plaice, and the depths of the places of recapture do not indicate a marked migration towards greater depths, the average of the 64 depths

Fig. 10. *Marking experiments with plaice in the spring of 1920.*
Recaptures west of 7° 34′ E. Long. or south of 55° 00′ N. Lat. or north of 56° 00′.
Females denoted by a spot, males by an arrow head.

known being only 16.4 m (16.0 for 22 recaptures in May and 16.6 for 42 recaptures in June). During July no plaice were recovered, but during August 7 specimens were secured (4 ♂♂ and 3 ♀♀), and of the 6 depths known, the average was 16.9 m. During the interval between August 1920 and 1st of Oct. 1923 only 6 more specimens were recovered, and of these, two males, one of 35 cm (growth: 3 cm) and another of 33 cm (growth: 6 cm), were caught during October 1920 at the north-east end of the Dogger Bank. In December a male of 31 cm (growth: 3 cm) was recovered in the area B_4 west of List. During the following spring a male of 32 cm (growth: 7 cm) was recaptured in A_3 west of List and a female of

27.5 cm (growth: 3 cm) west of Knude Deep. Finally a female of 38 cm (growth: 14 cm) was caught on the Dogger Bank in July 1922.

It appears from these two experiments that the seaward migration during the summer is much less pronounced from these grounds of depths 15—16 cm than from Graa-Deep.

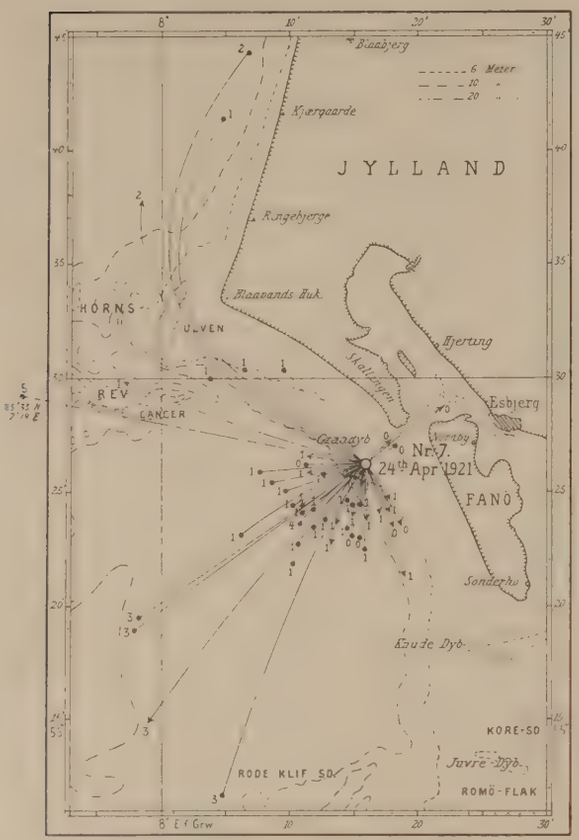

Fig. 11. *Marking experiment with plaice on 24th of April 1921.* Females denoted by a spot, males by an arrow head.

In Fig. 10 is given a survey of all the plaice in the experiments Nos. 1—6 which have been recovered west of 7° 34′ E. Long., or south of 55° N. Lat., or north of 56° N. Lat. It will be seen that the plaice liberated south of Horns Reef have shown much more inclination to migrate westwards and southwards than northwards across the reef.

Marking experiment No. 7 (Fig. 11). On 24th of April 1921 100 plaice were liberated at Graa Deep bar, at 55° 26′ N. Lat., 8° 16′ E. Long. (Depth: about 4 m).

Marking experimcnt No. 8 (Fig. 12). On 24th of April 1921 150 plaice were liberated off Fanø, at 55° 23′ N. Lat., 8° 17′ E. Long. (Depth: 10 m).

Marking experiment No. 9 (Fig. 13). On 24th of April 1921 100 plaice were liberated west of Sønderho, at 55° 20′ N. Lat., 8° 18′ E. Long. (Depth: 10 m).

In these three experiments a total of 350 plaice (169 ♂♂ and 181 ♀♀) was liberated from three stations west of the island of Fanø. During April 50 specimens (23 ♂♂ and 27 ♀♀) were recovered at places of somewhat greater depths than where they were liberated, the average depths of the places of recapture being 11.5 m. Only one specimen of these, a male, was captured in B_4, the rest being in A_3 south of Horns Reef. During May 110 specimens (51 ♂♂ and 59 ♀♀) were recaptured, 106 of them in A_3 south of Horns Reef on the average depth of 13 m (for 2 specimens the place of recapture is unknown). The recaptures took place particularly south-west of Graa-Deep so that the recovered plaice of experiment No. 7 had migrated chiefly towards S.W., whereas those belonging to Exp. No. 8 had travelled towards N.W., and those of Exp. No. 9 towards N.N.W. But obviously these different directions only indicate that the grounds particularly worked by the fishermen during May were situated in the directions mentioned above from the three stations of liberation.

Table 25. Showing for various length-groups of liberated plaice the Percentage Recaptured. Springs of 1920 and 1921.
(Theoretical standard deviations in brackets).

	♂			♀			♂ + ♀		
	Number of liber.	Number of recapt.	Percentage of recapt.	Number of liber.	Number of recapt.	Percentage of recapt.	Number of liber.	Number of recapt.	Percentage of recapt.
Length on liberation cm									
21—24	118	42	36 (± 4)	120	52	43 (± 5)	238	94	39 (± 3)
25—29	278	130	47 (± 3)	280	140	50 (± 3)	558	270	48 (± 2)
30—35	18	5	28 (± 11)	36	18	50 (± 8)	54	23	43 (± 7)
Total	414	177	43 (± 2)	436	210	48 (± 2)	850	387	46 (± 2)

During June 6 specimens (2 ♂♂ and 4 ♀♀) were recaptured north of Horns Reef in A_3 and 2 females south of the reef in A_3.

During July 8 specimens were recovered, one female in C_2, one in B_4, and 4 females and 2 males in A_3, all in the western part of A_3 south of Horns Reef. Finally during August one female was caught in A_3 and during September one female in B_4.

The experiments again indicate a distinct seaward migration during the summer.

b. Percentage of marked plaice recaptured.

Of the 850 plaice liberated in the spring experiments of 1920 and of 1921 46 % (Table 25) were recaptured, and 44 % within the first year after liberation. This is a smaller percentage of recaptures than that found from the spring experiment on the Horns Reef grounds in March or April during 1906—1912[1], when the percentage of recaptures within a year was 53. It appears, however, from these experiments that the earlier in the spring the experiments are carried out, the greater is, on the whole, the percentage of recapture, and for the years of the period 1906—1912 in which the experiments took place after the 14th of April the percentage was only 46. The difference of season may therefore chiefly account for the different results in 1906—1912 and in 1920—1921.

In Table 25 we find some slight evidence that the percentage of recapture is greater for marketable plaice than for undersized plaice, further that among plaice of the same length-group the percentage of recapture is greater for females than for males, and that accordingly the percentage of recapture is, on the whole, greater for females than for males, the females liberated having a greater average length than the males (see Table 24).

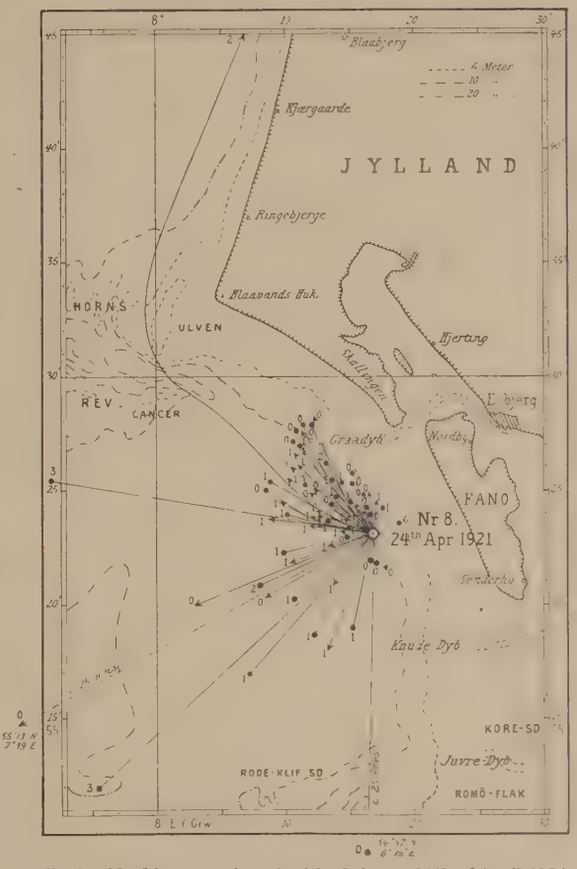

Fig. 12. *Marking experiment with plaice on 24th of April 1921.* Females denoted by a spot, males by an arrow head.

In the experiments of 23rd of April 1920 (see Table 26) only 2 % were recaptured during the first month after liberation, and the chief part of the remainder have found time before capture to emigrate to the deeper grounds, where 26 % of the liberated

Table 26. Showing the Percentage of Marked Plaice Recaptured within various periods of time.

	Number of plaice liberated	Percentage of plaice recaptured			
		in one month	in two months	in a year	total until 1. Oct. 1923
Marking experiments of					
23. April 1920	300	2	28	40	43
27.—28. May 1920.....	200	32.5	33	39	39.5
24. April 1921	350	40	48	51	51

[1] A. C. Johansen 1915, Table 4 p. 23.

plaice are caught duriug the second month after liberation together with the plaice liberated on these grounds on 27th and 28th of May. Of these plaice 32.5 % are captured during the first month after liberation and only 0.5 % during the second. In the experiments of April 1921, which took place not far away from the stations of the experiments of April 1920, 40 % of the liberated plaice were recaptured during the first month and only 8 % during the second. In all the three sets of experiments the number of recaptures occurring more than two month after the liberation, is small as compared with the number of those occurring during the first two months (see Table 27), and it is especially so in the experiments of April 1921.

Fig. 13. *Marking experiment with plaice on 24th of April 1921.* Females denoted by a spot, males by an arrow head.

c. Rate of growth of marked plaice.

From the marking experiments of April and May 1920 the growth curve represented in Fig. 14 has been worked out[1]. By means of the April experiments the average growth from 23rd of April up till the 27th of May was found to be 0.5 cm, and this has been added to the increase of length found in the May experiments, so as to measure the growth from the same date namely the 23rd of April.

It will be seen from the adjusted curve that the average annual growth is about 7 cm. It will be noticed that the average increase of length observed in the plaice recaptured during September and October is considerably greater than that, found in the plaice recaptured during the months November to March incl., and consequently there must be a rather large probable error in the determination of the annual growth. To gain some idea of the size of this error we have considered the increase of length observed for the 30 specimens of plaice recaptured between September 1920 and May 1921 incl. We have found the average increase of length in these 30 cases to be 6.1 with the standard deviation 0.6. As there must have been appreciable growth during Sept.—Oct. as well as during April—May and as this must tend to increase the standard deviation of the 30 observed values, we may probably assume that the standard deviation of the annual growth is not greater than 0.6.

Table 27. Showing the Distribution of Recaptures among various periods of time.

	Total number of plaice recaptured	Percentage of recaptures			
		during the first month	during the second month	during the 3rd—12th month	after one year until 1. Oct. 1923
Marking experiments of					
23. April 1920	128	5	61	28	6
27.—28. May 1920.....	79	82	1	15	1
24. April 1921	180	78	15	7	0

[1] A large percentage of the recaptured plaice were living when remeasured; when they were dead no correction for shrinkage was applied, as informations about the condition of the dead plaice are generally lacking.

The previous determinations of annual growth by means of marking experiments carried out on the Horns Reef grounds suffer from at least as great uncertainty, but the growth for the years 1908—1912 being only 5.3, 3.1, 4.6, 4.5, and 3.5 cm respectively, or on an average 4.2 cm, there can hardly be any doubt that the growth during these years was smaller than during 1920. During the years 1905—1907,

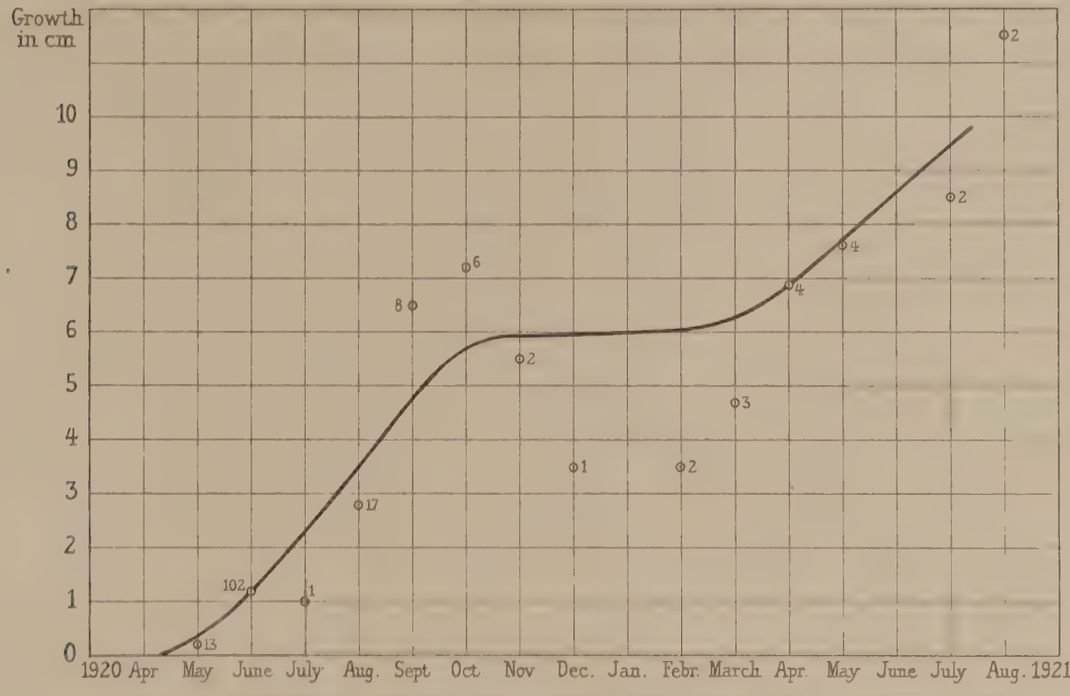

Fig. 14. *Rate of growth of marked plaice liberated south of Horns Reef in the spring of 1921.*
The figures indicate the number of observations from which the means for each month have been calculated.

however, the annual growth was found to be 7.9, 6.1 and 7.7 respectively, which is approximately the same as during 1920.

In the experiments of 1921 all the recaptures occur before the end of the first period of growth, and 92 % of them during the first two months after liberation, so that they hardly give any valuable informations about growth. The 8 specimens recaptured during June have had an average growth of only 0.2 cm and the 8 specimens recaptured during July an average growth of 2.1 cm, which slightly indicates a smaller growth during 1921 than during 1920.

VII. Summary.

On the basis of the fishing experiments with otter-trawl undertaken during the cruise of the "Dana" in September 1922 we have mapped out the density, the average length in age-groups, and the relative frequency of the two sexes in the Horns Reef area, and found the following characteristic features. The I- and II-groups occur with unusual frequency south of the Horns Reef inside the 30 metres curve especially in the region west of Graa Deep. At the same place the average length for each of these age-groups is considerably smaller than north and south of that place. The density for each age-group is, on the whole, distinctly smaller in the northern part of A_3 than in that lying south of Horns Reef. Outside the 20 metres curve the density of plaice older than three years is about the same north as south of Horns

Reef, but the average length for each age-group is considerably greater in the northern than in the southern area. Indeed, the growth is so different that when considering the density of marketable plaice we find that, outside the 20 metres curve the density is about five times as great north of Horns Reef (B_c) as south of the Reef, (B_a and B_b), although for each of the age-groups the maximum density is always found south of the reef. In the whole area investigated, except inside the 20 metres curve south of Horns Reef, the III-group is the dominant age-group among the marketable plaice, but along with this the IV-group forms quite a considerable proportion of the total, whilst the II-group is only of account as marketable plaice north of Horns Reef and in the southern area outside the 30 metres curve. South of the reef and inside the 30 metres curve, where the II-group is especially dense, the growth has been so slow that the size-limit has not yet been reached.

An investigation of the relative frequency of the two sexes in each age-group has shown that the females are relatively more frequent near the coast than further seawards and also that for each of the areas the relative frequency of females increases from one age-group to the next older. Considering in a bulk all plaice older than one year we notice a diminution in the relative frequency of females from the coast outwards. The sum for all the stations of individuals of an age-group caught per hour shows that a slight increase is found in the relative frequency of females with increasing age, but this may be explained by a surplus of the oldest males having probably migrated out of the area investigated, since they are in a predominant majority in the western part of this area. The distribution of males and females is explained by assuming that the males have a greater inclination than the females of the same age-group to leave the coastal grounds. The plaice dealt with here were all judged to be immature, and the peculiar numerical distribution of males and females can not be due solely to the mature males having already emigrated out of the investigated area, as the increasing relative frequency of males from the coast outwards has been already quite distinctly observed in the II-group, of which certainly no individual has attained maturity, and which hardly spread westward of the area investigated. For each station it is noticed that the average length of females is, as a rule, slightly greater than that of the males of the same age-group. Comparing the bulk of females and of males of an age-group from the investigated area south of Horns Reef or north of the reef, this difference disappears, and therefore we are inclined to think that at this age the growth is the same for males and for females, and that the difference in average length at a certain place, is simply brought about by the larger males having emigrated at a greater rate than females of the same length.

Fishing experiments as extensive as these undertaken in September 1922 have not previously been carried out in the Horns Reef area during the autumn, and consequently our comparison of the state in Sept. 1922 with that in former years gives less certain results than those stated above. The area best investigated is that west of Graa Deep inside the 30 metres curve, where the density of all the age-groups and especially of the I- and II-groups appears to be at least three times as great in September 1922 as in the autumn of the years 1903—1905. The investigations undertaken during the spring of 1907 also indicate a much smaller density, than in September 1922. The earlier observations taken north of Horns Reef are not very numerous; but they seem to indicate that, in 1922, the density is comparatively great outside the 20 metres curve and comparatively small inside that curve.

As regards the growth of the plaice the rather scarce measurements from 1905 indicate that the average lengths in the II—IV-groups were in 1905, in the area west of Graa Deep inside the 30 metres curve 4—6 cm greater than in 1922. The average lengths in the same age-groups were in C_2 only a couple of centimetres greater than in 1922, so that we may suppose that it is the growth rate in the areas A_a and B_a which were densely populated in 1922, that has altered especially. A comparison with the investigations during the spring of 1907 show that the average length of the II-group north of Horns Reef, is in 1922 not as much below the previous value as that occurring south of Horns Reef, which confirms the supposition that the altered growth rate is connected with the considerable crowding of the I- and II-groups west of Graa Deep.

A comparison of the length for various age-groups, together with the information obtained from the marking experiments undertaken in 1920 leads us to conclude that the small average lengths observed in September 1922 are chiefly the results of an abnormally slow growth during 1922 and perhaps during 1921.

The data from the years 1903, 1905, and 1907 confirm, on the whole, the observation that the relative frequency of females decreases from the coastal waters seawards. They slightly indicate that the females are relatively less frequent on the Horns Reef grounds in 1922 than in 1903 and 1905, what may be connected with a later attainment of maturity and a consequently later segregration of males and females.

The samples of marketable plaice from the Horns Reef area during September to November 1922, illustrate by the distribution of the fishing-places of the catches, the results found from the fishing experiments concerning the density of marketable plaice. Of the 171 samples from the area investigated in September, 145 have originated from the part of B_4 situated north of Horns Reef, where we have found the marketable plaice to be three to four times as dense as in any of the other areas investigated. The samples from B_4 (which all arise from this northern part, named by us B_c) as well as those from A_3 show that the relative frequency of plaice over 30 cm has decreased very much since 1919, both as compared with the total number of marketable plaice and with plaice over 27 cm in length. The samples from that part of C_2, which lies south-east of the north-eastern end of the Dogger Bank also show a decreasing length from 1919 to 1922, when the average length of plaice is even smaller than in 1916. There can be no doubt that this is chiefly explained by the restriction on fishing during the War and the fishing being carried on again more intensely from and after 1919, which caused the average age of marketable plaice to be particularly high in 1919. As regards B_4, we find in the exceptionally slow growth during the summer of 1922 and perhaps of 1921, a cause that must also work towards a decline in the number of the plaice over 30 cm in length as compared with plaice between 27 and 30 cm.

The marketable samples from B_4 and A_3 measured in the autumn of 1922 are also inferior in length as compared with samples from the years 1904—1905, and this is probably due to the slower growth during the years 1921—1922.

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Tables of Measurements A.

The following tables give the results of fishing experiments carried out with a 50 feet otter-trawl with extra cod-end.

With one exception (St. 2820) the lengths of all the plaice caught during an experiment have been measured. At most of the stations all the plaice, except those of the 0-group, have been examined as to sex, and as to age by means of otoliths. At some of the stations the age and sex determination of the most numerous length-groups have only been undertaken for a portion of the specimens; their number are then given in a parenthesis, after the number calculated by distributing the total specimens of a length-group proportionately to the specimens examined. At such stations it has sometimes been possible to determine the age of the smallest specimens of the I-group alone by means of their lengths, if so the determination of sex has not been carried out, and the specimens of such length-groups have been distributed equally among males and females. When no figures in parenthesis occur in a table, all individuals excepts those of the 0-group have been age- and sex-examined.

All the specimens examined as to sex have been found immature; but it is hardly possible in all cases so early as in September to decide whether an individual will reach maturity in the approaching spawning-period or not.

13. Sept. 1922 — Station 2804, 55°16′ N. Lat. 5°39′ E. Long., Depth: 45 m — Duration of fishing: 2h.

Sex	♂			♀					♂+♀				
Age-group	III	IV	Total	III	IV	V	?	Total	III	IV	V	?	Total
Length cm													
21	1	..	1	..	..	..	..	..	1	..	..	..	1
22	..	..	..	..	..	..	..	..	..	..	..	..	..
23	..	..	..	1	..	..	..	1	1	..	..	..	1
24	3	1	4	..	..	..	..	..	3	1	..	..	4
25	..	1	1	..	..	..	..	..	..	1	..	..	1
26	1	1	2	..	1	..	..	1	1	2	..	..	3
27	..	1	1	..	1	..	..	1	..	2	..	..	2
28	..	..	..	1	..	..	..	1	1	..	..	..	1
29	..	..	..	1	..	1	1	3	1	..	1	1	3
30	..	..	..	1	..	1	..	2	1	..	1	..	2
31	..	..	..	..	..	1	..	1	..	..	1	..	1
Total	5	4	9	4	2	3	1	10	9	6	3	1	19
Average length[2]	23.8	25.5	24.6	27.5	26.5	30.0	29.0	28.2	25.4	25.8	30.0	29.0	26.5

13. Sept. 1922 — Station 2805, 55°18′ N. Lat. 6°07′ E. Long., Depth: 44 m — Duration of fishing: 2h.

Sex	♂				♀					♂+♀				
Age-group	II	III	IV	Total	II	III	IV	V	Total	II	III	IV	V	Total
Length cm														
21	1	..	..	1	..	..	..	..	..	1	..	..	..	1
22	..	..	..	..	..	2	..	..	2	..	2	..	..	2
23	1	2	1	4	..	..	..	..	..	1	2	1	..	4
24	1	..	1	2	..	..	1	..	1	1	..	2	..	3
25	..	3	..	3	1	1	1	..	3	1	4	1	..	6
26	..	3	..	3	..	1	..	..	1	..	4	..	..	4
27	1	..	2	3	..	..	..	..	..	1	..	2	..	3
28	..	..	..	..	..	..	..	..	..	..	..	..	..	..
29	..	..	..	..	..	..	..	..	..	..	..	..	..	..
30	..	..	1	1	..	..	..	..	..	..	..	1	..	1
31	..	..	..	..	..	..	..	..	..	..	..	..	..	..
32	..	..	..	..	..	..	..	1[1]	1	..	..	..	1[1]	1
Total	4	8	5	17	1	4	2	1	8	5	12	7	1	25
Average length	23.8	24.9	26.2	25.0	25.0	23.8	24.5	32.0	25.1	24.0	24.5	25.7	32.0	25.0

[1] Will probably become mature at the next period of spawning.

[2] The average lengths given in the Tables of Measurements have to be corrected by 0.5.

13. Sept. 1922 — Station 2806, 55°16′ N. Lat. 6°33′ E. Long., Depth: 40 m — Duration of fishing: 1h.

Sex	♂			♀			♂+♀		
Age-group	II	III	Total	II	III	Total	II	III	Total
Length cm									
18	1	1	2	..	..	..	1	1	2
19	3	..	3	..	..	..	3	..	3
20	1	1	2	..	..	..	1	1	2
21	4	3	7	1	1	2	5	4	9
22	1	1	2	..	2	2	1	3	4
23	..	..	..	..	1	1	..	1	1
Total	10	6	16	1	4	5	11	10	21
Average length	20.1	20.5	20.3	21.0	22.0	21.8	20.2	21.1	20.6

14. Sept. 1922 — Station 2809, 55°37′ N. Lat. 6°08′ E. Long., Depth: 45 m — Duration of fishing: 1h.

Sex	♂			
Age-group	III	IV	V	Total
Length cm				
21	1	..	..	1
22	..	..	..	..
23	1	..	..	1
24	..	..	..	..
25	..	..	1	1
26	..	1	..	1
27	..	..	..	..
28	1	..	..	1
Total	3	1	1	5
Average length	24.0	26.0	25.0	24.6

13. Sept. 1922 — Station 2807, 55°20′ N. Lat. 7°00′ E. Long., Depth: 28—30 m — Duration of fishing: 1h.

Sex	♂					♀				♂+♀					
Age-group	I	II	III	?	Total	II	III	IV	Total	I	II	III	IV	?	Total
Length cm															
14	..	..	..	..	..	1	..	..	1	..	1	..	..	..	1
15	..	4	..	..	4	1	..	..	1	..	5	..	..	..	5
16	1	9	..	..	10	1	..	..	1	1	10	..	..	..	11
17	1	8	..	..	9	3	3	..	6	1	11	3	..	..	15
18	..	6	1	1	8	3	..	..	3	..	9	1	..	1	11
19	..	5	2	..	7	3	1	..	4	..	8	3	..	..	11
20	..	2	..	..	2	1	2	..	3	..	3	2	..	..	5
21	..	1	3	..	4	1	6	..	7	..	2	9	..	..	11
22	..	..	3	..	3	..	3	1	4	..	..	6	1	..	7
23	..	..	2	..	2	..	..	..	..	..	..	2	..	..	2
24	..	..	..	..	..	..	2	..	2	..	..	2	..	..	2
Total	2	35	11	1	49	14	17	1	32	2	49	28	1	1	81
Average length	16.5	17.3	21.0	18.0	18.1	17.7	20.6	22.0	19.4	16.5	17.4	20.8	22.0	18.0	18.6

14. Sept. 1922 — Station 2808, 55°25′ N. Lat. 6°07′ E. Long., Depth: 49 m — Duration of fishing: 2h.

Sex	♂					♀						♂+♀					
Age-group	II	III	IV	V	Total	II	III	IV	V	VI	Total	II	III	IV	V	VI	Total
Length cm																	
20	1	..	..	..	1	..	..	..	..	..	..	1	..	..	..	..	1
21	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
22	..	..	..	..	..	..	..	1	..	..	1	..	..	1	..	..	1
23	..	1	..	..	1	1	..	..	..	..	1	1	1	..	..	..	2
24	..	1	..	..	1	..	..	..	..	..	..	..	1	..	..	..	1
25	..	2	..	..	2	..	..	..	..	..	..	..	2	..	..	..	2
26	..	2	2	..	4	..	..	..	1	..	1	..	2	2	1	..	5
27	..	2	..	..	2	..	..	..	..	..	..	..	2	..	..	..	2
28	..	..	..	..	..	..	2	..	..	..	2	..	2	..	..	..	2
29	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
30	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
31	..	..	..	..	..	..	..	1	..	..	1	..	..	1	..	..	1
32	..	..	..	1	1	..	..	..	..	..	..	..	..	..	1	..	1
33	..	..	..	..	..	..	..	..	..	2	2	..	..	..	..	2	2
Total	1	8	2	1	12	1	2	2	1	2	8	2	10	4	2	2	20
Average length	20.0	25.4	26.0	32.0	25.6	23.0	28.0	26.5	26.0	33.0	28.0	21.5	25.9	26.3	29.5	33.0	26.6

14. Sept. 1922 — Station 2810, 55°37′ N. Lat. 6°36′ E. Long., Depth: 38 m — Duration of fishing: 1½ h.

Sex	♂					♀					♂+♀				
Age-group	II	III	IV	V	Total	II	III	IV	V	Total	II	III	IV	V	Total
Length cm															
19	..	1	..	..	1	1	..	..	..	1	1	1	..	..	2
20	1	..	..	..	1	1	..	..	..	1	2	..	..	..	2
21	2	1	..	..	3	..	1	..	..	1	2	2	..	..	4
22	5	5	..	..	10	2	2	..	..	4	7	7	..	..	14
23	2	8	1	..	11	2	2	1	..	5	4	10	2	..	16
24	4	5	1	..	10	2	6	3	1	12	6	11	4	1	22
25	..	3	1	..	4	..	10	..	..	10	..	13	1	..	14
26	1	8	2	2	13	..	4	1	..	5	1	12	3	2	18
27	..	3	5	..	8	..	..	..	..	..	..	3	5	..	8
28	..	..	2	..	2	..	1	2	..	3	..	1	4	..	5
29	..	1	1	..	2	..	1	..	..	1	..	2	1	..	3
30	..	..	..	..	..	..	..	..	1	1	..	..	..	1	1
31	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
32	..	..	1	..	1	..	..	..	..	..	..	..	1	..	1
Total	15	35	14	2	66	8	27	7	2	44	23	62	21	4	110
Average length	22.7	24.2	26.9	26.0	24.5	22.1	24.7	25.3	27.0	24.4	22.5	24.4	26.3	26.5	24.45

14. Sept. 1922 — Station 2811, 55°36′ N. Lat. 7°00′ E. Long., Depth: 30 m — Duration of fishing: 1 h.

Sex	♂					♀					♂+♀					
Age-group	I	II	III	IV	Total	II	III	IV	V	Total	I	II	III	IV	V	Total
Length cm																
16	..	..	..	..	..	1	..	..	..	1	..	1	..	..	..	1
17	..	2	..	..	2	..	..	..	..	..	..	2	..	..	..	2
18	..	4	..	..	4	..	..	..	..	..	..	4	..	..	..	4
19	2	4	1	..	7	2	1	..	..	3	2	6	2	..	..	10
20	..	11	1	..	12	3	..	..	..	3	..	14	1	..	..	15
21	..	6	8	..	14	1	5	1	..	7	..	7	13	1	..	21
22	..	6	7	..	13	3	7	2	..	12	..	9	14	2	..	25
23	..	3	4	1	8	6	9	..	..	15	..	9	13	1	..	23
24	..	2	5	2	9	3	10	1	1	15	..	5	15	3	1	24
25	..	2	4	1	7	2	5	..	..	7	..	4	9	1	..	14
26	..	..	2	2	4	1	3	1	..	5	..	1	5	3	..	9
27	..	..	3	1	4	..	4	..	..	4	..	..	7	1	..	8
28	..	..	1	..	1	1	1	1	1	4	..	1	2	1	1	5
29	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
30	..	..	1	1	2	..	..	1	..	1	..	..	1	2	..	3
31	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
32	..	..	..	1	1	..	..	..	..	..	..	..	..	1	..	1
33	..	..	..	..	..	..	1	..	..	1	..	..	1	..	..	1
Total	2	40	37	9	88	23	46	7	2	78	2	63	83	16	2	166
Average length	19.0	20.7	23.4	26.3	22.3	22.4	23.8	24.7	26.0	23.6	19.0	21.3	23.6	25.6	26.0	22.91

15. Sept. 1922 — Station 2812, 55°20′ N. Lat. 7°45′ E. Long., Depth: 23 m — Duration of fishing: 1 h.

Sex	♂							♀							♂+♀							
Age-group	I	II	III	IV	VI	?	Total	I	II	III	IV	?	Total	0	I	II	III	IV	VI	?	Total
Length cm																					
6	..	..	..	..	..	..	..	..	..	..	..	..	..	21	..	..	..	..	..	..	..	21
7	..	..	..	..	..	..	..	..	..	..	..	..	..	45	..	..	..	..	..	..	..	45
8	1	..	..	..	..	..	1	1	..	..	..	..	1	6	2	..	..	..	..	..	..	8
9	21	..	..	..	..	..	21	22	..	..	..	..	22	..	43	..	..	..	..	..	..	43
10	106	..	..	..	..	..	106	106	..	..	..	..	106	..	212	..	..	..	..	..	..	212
11	115	..	..	..	..	..	115	115	..	..	..	..	115	..	230	3	..	..	..	..	..	233
12	144 (12)	..	..	..	..	..	144 (12)	192 (16)	24 (2)	..	..	..	216 (18)	..	336	24	..	..	..	..	..	360
13	101 (16)	31 (5)	..	..	..	..	132 (21)	145 (23)	63 (10)	..	..	..	208 (33)	..	246	94	..	..	..	..	..	340
14	28 (14)	43 (21)	..	..	..	..	71 (35)	86 (42)	43 (21)	..	..	..	129 (63)	..	114	86	..	..	..	..	..	200
15	9 (9)	36 (36)	1 (1)	..	..	..	46 (46)	13 (13)	50 (50)	..	..	1 (1)	64 (64)	..	22	86	1	..	..	1	..	110
16	5 (5)	8 (8)	3 (3)	..	..	1 (1)	17 (17)	..	13 (13)	2 (2)	..	..	15 (15)	..	5	21	5	..	..	1	..	32
17	2 (2)	9 (9)	4 (4)	..	..	..	15 (15)	..	10 (10)	4 (4)	..	..	14 (14)	..	2	19	8	..	..	..	..	29
18	..	1 (1)	2 (2)	..	..	..	3 (3)	1 (1)	6 (6)	6 (6)	..	..	13 (13)	..	1	7	8	..	..	..	..	16
19	..	1 (1)	2 (2)	..	1 (1)	..	4 (4)	..	2 (2)	3 (3)	..	..	5 (5)	..	..	3	5	..	1	..	..	9
20	..	2 (2)	..	..	..	..	2 (2)	..	..	3 (3)	1 (1)	..	4 (4)	..	..	2	3	1	..	..	..	6
21	..	..	..	..	..	..	..	..	..	1 (1)	2 (2)	..	3 (3)	..	..	..	1	2	..	..	..	3
22	..	..	1 (1)	..	..	..	1 (1)	..	..	..	..	..	..	..	..	..	1	..	..	..	..	1
23	..	..	1 (1)	1 (1)	..	..	2 (2)	..	..	..	1 (1)	..	1 (1)	..	..	..	1	2	..	..	..	3
24	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
25	..	..	..	1 (1)	..	..	1 (1)	..	..	2 (2)	2 (2)	..	4 (4)	..	..	..	2	3	..	..	..	5
26	..	..	..	..	..	..	..	..	..	1 (1)	..	..	1 (1)	..	..	..	1	..	..	..	..	1
Total	532	131	14	2	1	1	681	681	211	22	6	1	921	75	1213	345	36	8	1	2	1680
Average length	11.7	14.53	17.9	24.0	19.0	16.0	—	11.8	14.14	19.2	22.5	15.0	—	6.8	11.82	14.26	18.7	22.9	19.0	15.5	12.305

15. Sept. 1922 — Station 2813, 55°20′ N. Lat. 8°01′ E. Long., Depth: 17 m — Duration of fishing: $^1/_2{}^h$.

Sex	♂				♀				♂+♀				
Age-group	I	II	III	Total	I	II	III	Total	0	I	II	III	Total
Length cm													
5	..	..	..	..	..	..	..	..	23	..	..	..	23
6	..	..	..	..	..	..	..	..	25	..	..	..	25
7	..	..	..	..	..	..	..	..	1	..	..	..	1
8	..	..	..	..	..	..	..	..	..	..	..	..	..
9	8	..	..	8	8	..	..	8	..	16	..	..	16
10	16	..	..	16	15	..	..	15	..	31	..	..	31
11	23	..	..	23	24	..	..	24	..	47	..	..	47
12	38 (38)	8 (8)	..	46 (46)	34 (34)	7 (7)	..	41 (41)	..	72	15	..	87
13	7 (7)	18 (18)	..	25 (25)	11 (11)	15 (15)	..	26 (26)	..	18	33	..	51
14	1 (1)	7 (7)	..	8 (8)	2 (2)	8 (8)	..	10 (10)	..	3	15	..	18
15	1 (1)	1 (1)	1 (1)	3 (3)	..	3 (3)	2 (2)	5 (5)	..	1	4	3	8
16	..	..	..	..	..	..	..	..	..	..	..	..	..
17	..	..	..	..	..	1 (1)	1 (1)	2 (2)	..	..	1	1	2
18	..	..	..	..	..	1 (1)	..	1 (1)	..	..	1	..	1
Total	94	34	1	129	94	35	3	132	49	188	69	4	310
Average length	11.3	13.0	15.0	—	11.3	13.5	15.7	—	5.55	11.31	13.25	15.5	10.88

15. Sept. 1922 — Station 2814, 55°20′ N. Lat. 8°16′ E. Long.. Depth: 13 m — Duration of fishing: $^1/_2{}^h$.

Sex	♂						♀						♂+♀						
Age-group	I	II	III	IV	?	Total	I	II	III	IV	?	Total	0	I	II	III	IV	?	Total
Length cm																			
5	..	..	..	..	..	..	..	..	..	..	..	..	4	..	..	..	..	..	4
6	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
7	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
8	2	..	..	..	..	2	2	..	..	..	..	2	..	4	..	..	..	..	4
9	6	..	..	..	..	6	7	..	..	..	..	7	..	13	..	..	..	..	13
10	10 (5)	2 (1)	..	..	..	12 (6)	14 (7)	..	..	..	..	14 (7)	..	24	2	..	..	..	26
11	12 (6)	10 (5)	..	..	..	22 (11)	22 (11)	16 (8)	..	..	..	38 (19)	..	34	26	..	..	..	60
12	4 (2)	16 (8)	..	..	..	20 (10)	14 (7)	19 (10)	..	..	..	33 (17)	..	18	35	..	..	..	53
13	..	5 (5)	1 (1)	..	..	6 (6)	2 (2)	18 (18)	1 (1)	..	..	21 (21)	..	2	23	2	..	..	27
14	..	6 (6)	..	..	..	6 (6)	..	21 (21)	2 (2)	..	..	23 (23)	..	..	27	2	..	..	29
15	..	1 (1)	1 (1)	..	..	2 (2)	2 (2)	8 (7)	5 (5)	..	..	15 (14)	..	2	9	6	..	..	17
16	..	1 (1)	2 (2)	..	1 (1)	4 (4)	..	6 (6)	1 (1)	1 (1)	..	8 (8)	..	..	7	3	1	1	12
17	..	1 (1)	4 (4)	1 (1)	1 (1)	7 (7)	..	6 (6)	2 (2)	..	..	8 (8)	..	..	7	6	1	1	15
18	..	..	1 (1)	1 (1)	..	2 (2)	..	1 (1)	6 (5)	..	2 (2)	9 (8)	..	..	1	7	1	2	11
19	..	..	..	1 (1)	..	1 (1)	..	..	1 (1)	1 (1)	..	2 (2)	..	..	..	1	2	..	3
20	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
21	..	..	..	..	..	..	..	..	..	3 (3)	..	3 (3)	..	..	..	..	3	..	3
22	..	..	..	1 (1)	..	1 (1)	..	..	..	..	..	..	..	..	..	..	1	..	1
23	..	..	..	..	..	..	..	..	..	1 (1)	..	1 (1)	..	..	..	..	1	..	1
Total	34	42	9	4	2	91	63	95	18	6	2	184	4	97	137	27	10	4	279
Average length	10.3	12.4	16.2	19.0	16.5	—	10.9	13.35	16.4	20.2	18.0	—	5.0	10.67	13.04	16.3	19.7	17.3	12.72

19. Sept. 1922 — Station 2815. 55°28′5 N. Lat. 8°05′ E. Long., Depth: 14—19 m — Duration of fishing: 1^h.

Sex	♂						♀							♂+♀							
Age-group	I	II	III	IV	?	Total	I	II	III	IV	V	?	Total	0	I	II	III	IV	V	?	Total
Length cm																					
4	..	..	..	..	..	..	..	..	..	..	..	..	..	5	..	..	..	..	..	..	5
5	..	..	..	..	..	..	..	..	..	..	..	..	..	80	..	..	..	..	..	..	80
6	..	..	..	..	..	..	..	..	..	..	..	..	..	52	..	..	..	..	..	..	52
7	1	..	..	..	..	1	..	..	..	..	..	..	..	4	1	..	..	..	..	..	5
8	10	..	..	..	..	10	10	..	..	..	..	..	10	..	20	..	..	..	..	..	20
9	21	..	..	..	..	21	20	..	..	..	..	..	20	..	41	..	..	..	..	..	41
10	36 (12)	3 (1)	..	..	..	39 (13)	42 (14)	6 (2)	..	..	..	..	48 (16)	..	78	9	..	..	..	..	87
11	51 (10)	25 (5)	..	..	..	76 (15)	46 (9)	20 (4)	..	..	..	..	66 (13)	..	97	45	..	..	..	..	142
12	32 (8)	35 (9)	..	..	..	67 (17)	8 (2)	32 (8)	..	..	..	..	40 (10)	..	40	67	..	..	..	..	107
13	5 (5)	17 (17)	2 (2)	..	..	24 (24)	6 (6)	19 (19)	3 (3)	..	..	..	28 (28)	..	11	36	5	..	..	..	52
14	3 (3)	18 (18)	3 (3)	..	..	24 (24)	..	22 (22)	1 (1)	..	..	1 (1)	24 (24)	..	3	40	4	..	..	1	48
15	2 (2)	6 (6)	3 (3)	..	1 (1)	12 (12)	2 (2)	7 (7)	5 (5)	..	..	..	14 (14)	..	4	13	8	..	..	1	26
16	..	1 (1)	3 (3)	..	..	4 (4)	2 (2)	10 (10)	7 (7)	..	..	..	19 (19)	..	2	11	10	..	..	..	23
17	..	..	3 (3)	1 (1)	1 (1)	5 (5)	1 (1)	5 (5)	7 (7)	1 (1)	..	..	14 (14)	..	1	5	10	2	..	1	19
18	..	2 (2)	2 (2)	2 (2)	..	6 (6)	..	2 (2)	5 (5)	..	..	..	7 (7)	..	..	4	7	2	..	..	13
19	..	1 (1)	1 (1)	2 (2)	..	4 (4)	..	1 (1)	4 (4)	3 (3)	..	..	8 (8)	..	..	2	5	5	..	..	12
20	..	..	..	3 (3)	..	3 (3)	..	..	2 (2)	4 (4)	..	..	6 (6)	..	..	..	2	7	..	..	9
21	..	..	..	..	..	..	..	..	2 (2)	5 (5)	..	..	7 (7)	..	..	..	2	5	..	..	7
22	..	..	..	2 (2)	..	2 (2)	..	1 (1)	1 (1)	4 (4)	1 (1)	..	7 (7)	..	..	1	1	6	1	..	9
23	..	..	..	..	..	..	..	..	..	2 (2)	..	..	2 (2)	..	..	..	..	2	..	..	2
24	..	..	..	..	..	..	..	..	1 (1)	..	..	..	1 (1)	..	..	..	1	..	..	..	1
25	..	..	..	..	..	..	..	..	..	3 (3)	..	..	3 (3)	..	..	..	..	3	..	..	3
Total	161	108	17	10	2	298	137	125	38	22	1	1	324	141	298	233	55	32	1	3	763
Average length	10.7	12.6	15.7	19.5	16.0	—	10.5	13.2	17.2	21.3	22.0	14.0	—	5.39	10.59	12.89	16.7	20.7	22.0	15.3	11.24

19. Sept. 1922 — Station 2816, 55°20′ N. Lat. 7°20′ E. Long., Depth: 24 m — Duration of fishing: $^1/_2{}^h$.

Sex	♂					♀						♂+♀					
Age-group	I	II	III	IV	Total	I	II	III	IV	?	Total	I	II	III	IV	?	Total
Length cm																	
10	2	..	..	..	2	2	..	..	..	..	2	4	..	..	..	..	4
11	24 (12)	..	..	..	24 (12)	8 (4)	..	..	..	..	8 (4)	32	..	..	..	..	32
12	21 (21)	21 (21)	..	..	42 (42)	19 (19)	16 (16)	..	..	..	35 (35)	40	37	..	..	..	77
13	55 (11)	85 (17)	..	..	140 (28)	30 (6)	85 (17)	..	..	..	115 (23)	85	170	..	..	..	255
14	16 (4)	120 (30)	..	..	136 (34)	24 (6)	88 (22)	..	..	..	112 (28)	40	208	..	..	..	248
15	8 (2)	80 (21)	..	..	88 (23)	..	80 (21)	..	..	..	80 (21)	8	160	..	..	..	168
16	..	34 (17)	10 (5)	..	44 (22)	..	38 (19)	14 (7)	..	..	52 (26)	..	72	24	..	..	96
17	..	4 (4)	3 (3)	..	7 (7)	1 (1)	10 (10)	5 (5)	..	..	16 (16)	1	14	8	..	..	23
18	..	2 (2)	6 (6)	..	8 (8)	..	4 (4)	6 (6)	..	..	10 (10)	..	6	12	..	..	18
19	..	1 (1)	2 (2)	1 (1)	4 (4)	..	2 (2)	2 (2)	..	1 (1)	5 (5)	..	3	4	1	1	9
20	..	..	5 (5)	..	5 (5)	..	..	5 (5)	1 (1)	..	6 (6)	..	..	10	1	..	11
21	..	..	..	..	..	..	..	2 (2)	..	..	2 (2)	..	..	2	..	..	2
22	..	..	2 (2)	..	2 (2)	..	..	3 (3)	..	..	3 (3)	..	..	5	..	..	5
23	..	..	1 (1)	1 (1)	2 (2)	..	..	1 (1)	1 (1)	..	2 (2)	..	..	2	2	..	4
24	..	..	..	..	..	..	..	1 (1)	..	..	1 (1)	..	..	1	..	..	1
25	..	..	..	..	..	..	..	1 (1)	1 (1)	..	2 (2)	..	..	1	1	..	2
26	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
27	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
28	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
29	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
30	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
31	..	..	..	..	..	..	..	1 (1)	..	..	1 (1)	..	..	1	..	..	1
Total	126	347	29	2	504	84	323	41	3	1	452	210	670	70	5	1	956
Average length	12.7	14.13	18.1	21.0	—	12.9		18.7	22.7	19.0	—	12.73	14.21	18.4	22.0	19.0	14.24

21. Sept. 1922 — Station 2817, 55°27′ N. Lat. 7°15′ E. Long., Depth: 30 m — Duration of fishing: 1^h.

Sex	♂						♀						♂+♀					
Age-group	I	II	III	IV	V	Total	I	II	III	IV	V	Total	I	II	III	IV	V	Total
Length cm																		
12	..	..	..	..	..	..	1 (1)	..	..	..	..	1 (1)	1	..	..	..	..	1
13	12 (2)	30 (5)	..	..	..	42 (7)	6 (1)	42 (7)	..	..	..	48 (8)	18	72	..	..	..	90
14	..	49 (7)	..	..	..	49 (7)	28 (4)	35 (5)	..	..	..	63 (9)	28	84	..	..	..	112
15	5 (1)	40 (8)	..	..	..	45 (9)	5 (1)	25 (5)	..	..	..	30 (6)	10	65	..	..	..	75
16	4 (1)	22 (11)	..	..	..	26 (13)	..	8 (4)	2 (1)	2 (1)	..	12 (6)	4	30	2	2	..	38
17	..	12 (6)	4 (2)	..	..	16 (8)	2 (1)	18 (9)	4 (2)	..	..	24 (12)	2	30	8	..	..	40
18	..	6 (6)	2 (2)	..	..	8 (8)	..	3 (3)	2 (2)	..	..	5 (5)	..	9	4	..	..	13
19	..	2 (2)	3 (3)	2 (2)	..	7 (7)	..	4 (4)	4 (4)	1 (1)	..	9 (9)	..	6	7	3	..	16
20	..	1 (1)	4 (4)	..	..	5 (5)	..	..	5 (5)	1 (1)	..	6 (6)	..	1	9	1	..	11
21	..	1 (1)	3 (3)	1 (1)	1 (1)	6 (6)	..	1 (1)	4 (4)	2 (2)	..	7 (7)	..	2	7	3	1	13
22	..	..	4 (4)	..	..	4 (4)	..	..	1 (1)	1 (1)	..	2 (2)	..	..	5	1	..	6
23	..	..	2 (2)	..	..	2 (2)	..	..	..	1 (1)	..	1 (1)	..	..	2	1	..	3
24	..	..	2 (2)	2 (2)	..	4 (4)	..	..	..	..	1 (1)	1 (1)	..	..	2	2	1	5
25	..	..	1 (1)	2 (2)	..	3 (3)	..	..	1 (1)	..	..	1 (1)	..	..	2	2	..	4
26	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
27	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
28	..	..	..	..	1 (1)	1 (1)	..	..	..	..	..	..	..	..	..	..	1	1
Total	21	163	25	7	2	218	42	136	23	8	1	210	63	299	48	15	3	428
Average length	14.0	14.8	20.4	22.4	24.5	—	14.1	14.7	19.3	19.8	24.0	—	14.1	14.77	19.9	21.0	24.3	15.52

21. Sept. 1922 — Station 2818, 55°38′ N. Lat. 7°28′ E. Long., Depth: 16 m — Duration of fishing: $^1/_2{}^h$.

Sex	♂						♀					♂+♀							
Age-group	I	II	III	IV	?	Total	I	II	III	V	Total	0	I	II	III	IV	V	?	Total
Length cm																			
6	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	1
7	..	..	..	..	..	..	..	..	..	..	..	9	..	..	..	..	..	..	9
8	..	..	..	..	..	..	..	..	..	..	..	30	..	..	..	..	..	..	30
9	..	..	..	..	..	..	..	..	..	..	..	10	..	..	..	..	..	..	10
10	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	1
11	..	..	..	..	..	..	1	..	..	..	1	..	1	..	..	..	..	..	1
12	2	..	..	..	..	2	3	..	..	..	3	..	5	..	..	..	..	..	5
13	2	..	..	..	..	2	..	..	..	..	..	..	2	..	..	..	..	..	2
14	2	2	..	..	..	4	7	1	..	..	8	..	9	3	..	..	..	..	12
15	2	5	..	..	..	7	..	2	..	..	2	..	2	7	..	..	..	..	9
16	1	7	..	..	..	8	1	8	..	..	9	..	2	15	..	..	..	..	17
17	2	4	..	..	..	6	2	6	..	..	8	..	4	10		..	..	..	14
18	1	11	1	..	..	13	..	7	1	..	8	..	1	18	2	..	..	..	21
19	1	5	..	..	..	6	..	6	..	..	6	..	1	11	..	..	..	..	12
20	..	2	..	..	..	2	1	2	..	..	3	..	1	4	..	..	..	..	5
21	..	2	2	..	1	5	..	1	1	..	2	..	..	3	3	..	..	1	7
22	..	2	2	2	..	6	..	4	1	..	5	..	..	6	3	2	..	..	11
23	..	..	2	..	..	2	..	2	..	..	2	..	..	2	2	..	..	..	4
24	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
25	..	..	..	..	..	..	..	1	..	..	1	..	..	1	..	..	..	..	1
26	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
27	..	..	..	1	..	1	..	..	..	..	..	..	..	..	..	1	..	..	1
28	..	..	..	..	..	..	..	..	1	1	2	..	..	..	1	..	1	..	2
Total	13	40	7	3	1	64	15	40	4	1	60	51	28	80	11	3	1	1	175
Average length	15.0	17.6	21.4	23.1	21.0	17.8	14.3	18.4	22.3	28.0	17.8	8.0	14.6	17.95	21.7	23.1	28.0	21.0	14.94

21. Sept. 1922 — Station 2819, 55°38′ N. Lat. 7°40′ E. Long., Depth: 12 m — Duration of fishing: $^1/_2{}^h$.

Sex	♂				♀			♂+♀				
Age-group	I	II	III	Total	I	II	Total	0	I	II	III	Total
Length cm												
5	..	..	..	..	..	..	..	1	..	..	..	1
6	..	..	..	..	..	..	..	23	..	..	..	23
7	..	..	..	..	..	..	..	71	..	..	..	71
8	..	..	..	..	..	..	..	33	..	..	..	33
9	..	..	..	..	..	..	..	3	..	..	..	3
10	..	..	..	..	..	..	..	1	..	..	..	1
11	..	..	..	..	..	..	..	..	..	..	..	..
12	..	..	..	..	..	..	..	..	..	..	..	..
13	1	..	..	1	2	..	2	..	3	..	..	3
14	4	1	..	5	..	1	1	..	4	2	..	6
15	3	2	..	5	3	..	3	..	6	2	..	8
16	1	4	..	5	2	4	6	..	3	8	..	11
17	1	3	..	4	2	3	5	..	3	6	..	9
18	1	1	..	2	..	3	3	..	1	4	..	5
19	..	2	..	2	..	1	1	..	..	3	..	3
20	..	1	..	1	..	..	..	..	..	1	..	1
21	..	..	..	..	..	2	2	..	..	2	..	2
22	..	..	1	1	..	..	..	..	..	..	1	1
Total	11	14	1	26	9	14	23	132	20	28	1	181
Av. length	15.0	16.8	22.0	16.2	15.2	17.4	16.6	7.13	15.1	17.1	22.0	9.64

22. Sept. 1922 — Station 2821, 56°08′ N. Lat. 8°00′ E. Long., Depth: 17 m — Duration of fishing: 1h.

Sex	♂				♀			♂+♀				
Age-group	I	II	IV	Total	I	II	Total	0	I	II	IV	Total
Length cm												
5	..	..	..	..	..	..	..	3	..	..	..	3
6	..	..	..	..	..	..	..	33	..	..	..	33
7	..	..	..	..	..	..	..	62	..	..	..	62
8	..	..	..	..	..	..	..	32	..	..	..	32
9	..	..	..	..	..	..	..	..	..	..	..	..
10	..	..	..	..	..	..	..	..	..	..	..	..
11	..	..	..	..	..	..	..	..	..	..	..	..
12	..	..	..	..	..	..	..	..	..	..	..	..
13	..	..	..	..	..	..	..	..	..	..	..	..
14	..	..	..	..	1	..	1	..	1	..	..	1
15	..	..	..	..	..	..	..	..	..	..	..	..
16	..	..	..	..	1	..	1	..	1	..	..	1
17	..	..	..	..	..	..	..	..	..	..	..	..
18	..	..	..	..	..	..	..	..	..	..	..	..
19	1	1	..	2	..	..	..	..	1	1	..	2
20	1	..	..	1	..	1	1	..	1	1	..	2
21	..	..	..	..	..	..	..	..	..	..	..	..
22	..	..	..	..	..	..	..	..	..	..	..	..
23	..	..	..	..	..	..	..	..	..	..	..	..
24	..	..	..	..	..	1	1	..	..	1	..	1
25	..	..	..	..	..	..	..	..	..	..	..	..
26	..	..	..	..	..	1	1	..	..	1	..	1
27	..	..	..	..	..	..	..	..	..	..	..	..
28	..	..	..	..	..	..	..	..	..	..	..	..
29	..	..	..	..	..	..	..	..	..	..	..	..
30	..	..	..	..	..	..	..	..	..	..	..	..
31	..	..	..	..	..	..	..	..	..	..	..	..
32	..	..	..	..	..	..	..	..	..	..	..	..
33	..	..	..	..	..	..	..	..	..	..	..	..
34	..	..	1	1	..	..	..	..	..	..	1	1
Total	2	1	1	4	2	3	5	130	4	4	1	139
Av. length	19.5	19.0	34.0	23.0	15.0	23.3	20.0	6.95	17.3	22.3	34.0	7.88

22. Sept. 1922 — Station 2820, 56°08′ N. Lat. 7°10′ E. Long., Depth: 33 m — Duration of fishing: 2h — Total capture: 920 individuals.

Sex	♂						♀					♂+♀					
Age-group	I	II	III	IV	V	Total	I	II	III	IV	Total	I	II	III	IV	V	Total
Length cm																	
16	1	1	..	..	..	2	1	..	..	..	1	2	1	..	..	..	3
17	2	2	..	..	..	4	2	2	..	1	5	4	4	..	1	..	9
18	2	9	..	1	..	12	1	3	..	..	4	3	12	..	1	..	16
19	1	9	1	..	..	11	1	16	2	..	19	2	25	3	..	..	30
20	1	8	3	..	..	12	1	11	1	..	13	2	19	4	..	..	25
21	2	15	4	..	..	21	..	22	3	..	25	2	37	7	..	..	46
22	..	13	5	..	..	18	..	7	4	1	12	..	20	9	1	..	30
23	..	9	6	..	..	15	..	3	6	..	9	..	12	12	..	..	24
24	..	2	1	..	..	3	..	2	2	2	6	..	4	3	2	..	9
25	..	1	5	..	..	6	..	4	..	1	5	..	5	5	1	..	11
26	..	1	4	..	..	5	..	2	2	2	6	..	3	6	2	..	11
27	..	2	2	1	1	6	..	1	1	..	2	..	3	3	1	1	8
28	..	1	2	1	..	4	..	..	1	..	1	..	1	3	1	..	5
29	..	..	1	..	..	1	..	..	..	..	..	..	..	1	..	..	1
30	..	..	..	..	..	..	..	..	1	..	1	..	..	1	..	..	1
31	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
32	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
33	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
34	..	..	..	..	..	..	..	..	1	..	1	..	..	1	..	..	1
Total	9	73	34	3	1	120	6	73	24	7	110	15	146	58	10	1	230
Average length	18.6	21.0	23.6	24.3	27.0	21.68	17.8	20.9	23.6	23.4	21.46	18.3	20.93	23.6	23.7	27.0	21.58

22. Sept. 1922 — Station 2822, 55°52′ N. Lat. 7°41′ E. Long., Depth: 23 m — Duration of fishing: 1h.

Sex	♂						♀							♂+♀							
Age-group	I	II	III	IV	?	Total	I	II	III	IV	V	?	Total	0	I	II	III	IV	V	?	Total
Length cm																					
6	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	1
7	..	..	..	..	..	..	..	..	..	..	..	..	..	13	..	..	..	..	..	..	13
8	..	..	..	..	..	..	..	..	..	..	..	..	..	14	..	..	..	..	..	..	14
9	1	..	..	..	..	1	..	..	..	..	..	..	..	8	1	..	..	..	..	..	9
10	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
11	4	..	..	..	..	4	5	..	..	..	..	..	5	..	9	..	..	..	..	..	9
12	18 (2)	..	..	..	..	18 (2)	..	..	..	..	..	..	..	..	18	..	..	..	..	..	18
13	17 (6)	3 (1)	..	..	..	20 (7)	5 (2)	3 (1)	..	..	..	..	8 (3)	..	22	6	..	..	..	..	28
14	9 (3)	16 (5)	..	..	..	25 (8)	10 (3)	6 (2)	..	..	..	..	16 (5)	..	19	22	..	..	..	..	41
15	6 (2)	15 (5)	..	..	..	21 (7)	9 (3)	15 (5)	..	..	..	..	24 (8)	..	15	30	..	..	..	..	45
16	13 (5)	35 (13)	..	..	2 (1)	50 (19)	3 (1)	21 (8)	3 (1)	..	..	..	27 (10)	..	16	56	3	..	..	2	77
17	4 (2)	27 (14)	..	..	..	31 (16)	8 (4)	24 (12)	..	..	..	..	32 (16)	..	12	51	..	..	..	..	63
18	10 (5)	21 (10)	4 (2)	..	..	35 (17)	..	19 (9)	2 (1)	..	..	..	21 (10)	..	10	40	6	..	..	..	56
19	..	15 (7)	..	2 (1)	..	17 (8)	..	8 (4)	4 (2)	2 (1)	..	..	14 (7)	..	..	23	4	4	..	..	31
20	..	8 (7)	2 (2)	..	..	10 (9)	..	5 (5)	4 (3)	1 (1)	..	2(2)	12 (11)	..	..	13	6	1	..	2	22
21	..	2 (2)	2 (2)	..	..	4 (4)	..	3 (3)	1 (1)	..	..	..	4 (4)	..	..	5	3	..	..	..	8
22	..	..	1 (1)	1 (1)	..	2 (2)	..	4 (4)	1 (1)	..	..	..	5 (5)	..	..	4	2	1	..	..	7
23	..	..	1 (1)	..	..	1 (1)	..	..	..	..	..	..	..	..	..	..	1	..	..	..	1
24	..	..	..	..	..	..	..	2 (2)	2 (2)	..	..	..	4 (4)	..	..	2	2	..	..	..	4
25	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
26	..	..	..	..	..	..	..	..	1 (1)	..	..	..	1 (1)	..	..	..	1	..	..	..	1
27	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
28	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
29	..	..	..	2 (2)	..	2 (2)	..	..	..	2 (2)	..	..	2 (2)	..	..	..	..	4	..	..	4
30	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
31	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
32	..	..	..	..	..	..	..	..	..	..	1(1)	..	1 (1)	..	..	..	..	..	1	..	1
Total	82	142	10	5	2	241	40	110	18	5	1	2	176	36	122	252	28	10	1	4	453
Average length	14.2	16.7	19.9	23.6	16.0	—	14.5	17.1	19.8	23.2	32.0	20.0	—	7.8	14.27	16.89	19.9	23.4	32.0	18.0	15.83

22. Sept. 1922 — Station 2823, 55°52′ N. Lat. 7°00′ E. Long., Depth: 33 m — Duration of fishing: 1h.

Sex	♂					♀						♂+♀						
Age-group	I	II	III	IV	Total	II	III	IV	V	?	Total	I	II	III	IV	V	?	Total
Length cm																		
18	..	..	..	..	..	1	..	..	..	..	1	..	1	..	..	..	..	1
19	3	1	..	..	4	..	..	..	..	..	..	3	1	..	..	..	..	4
20	..	3	..	..	3	1	..	1	1	..	3	..	4	..	1	1	..	6
21	..	3	..	..	3	2	3	..	..	..	5	..	5	3	..	..	..	8
22	..	4	1	..	5	2	2	..	..	..	4	..	6	3	..	..	..	9
23	..	4	3	..	7	4	2	3	..	..	9	..	8	5	3	..	..	16
24	..	2	4	..	6	1	4	3	..	..	8	..	3	8	3	..	..	14
25	..	..	2	1	3	1	2	..	..	1	4	..	1	4	1	..	1	7
26	..	2	1	3	6	..	4	..	..	..	4	..	2	5	3	..	..	10
27	..	..	2	..	2	..	2	2	2	..	6	..	..	4	2	2	..	8
28	..	..	1	3	4	..	4	..	..	..	4	..	..	5	3	..	..	8
29	..	..	1	..	1	..	1	..	1	..	2	..	..	2	..	1	..	3
30	..	..	..	1	1	..	1	2	..	..	3	..	..	1	3	..	..	4
31	..	..	..	1	1	..	..	..	..	..	..	..	..	..	1	..	..	1
32	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
33	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
34	..	..	..	1	1	..	..	..	..	..	..	..	..	..	1	..	..	1
35	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
36	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
37	..	..	..	..	..	..	..	1	..	..	1	..	..	..	1	..	..	1
Total	3	19	15	10	47	12	25	12	4	1	54	3	31	40	22	4	1	101
Average length	19.0	22.2	24.9	28.2	24.2	22.1	25.1	26.0	25.8	25.0	24.7	19.0	22.2	25.0	27.0	25.8	25.0	24.44

23. Sept. 1922 — Station 2824, 55°00′ N. Lat. 7°00′ E. Long., Depth: 32 m — Duration of fishing: 1h.

Sex	♂							♀						♂+♀						
Age-group	II	III	IV	V	VI	VII	Total	II	III	IV	V	?	Total	II	III	IV	V	VI	VII	?	Total
Length cm																					
16	6 (6)	1 (1)	..	..	..	..	7 (7)	7 (7)	3 (3)	..	..	..	10 (10)	13	4	..	..	..	..	..	17
17	16 (8)	10 (5)	..	..	..	..	26 (13)	4 (2)	2 (1)	..	..	..	6 (3)	20	12	..	..	..	..	..	32
18	8 (2)	28 (7)	..	..	..	..	36 (9)	12 (3)	24 (6)	..	..	4 (1)	40 (10)	20	52	..	..	..	..	4	76
19	10 (3)	21 (6)	3 (1)	..	..	..	34 (10)	14 (4)	20 (6)	..	..	..	34 (10)	24	41	3	..	..	..	..	68
20	..	27 (9)	3 (1)	..	..	..	30 (10)	..	24 (8)	9 (3)	..	..	33 (11)	..	51	12	..	..	..	..	63
21	..	15 (5)	6 (2)	..	..	..	21 (7)	3 (1)	12 (4)	6 (2)	..	3 (1)	24 (8)	3	27	12	..	..	..	3	45
22	2 (1)	14 (7)	6 (3)	2 (1)	2 (1)	..	26 (13)	..	10 (5)	8 (4)	..	..	18 (9)	2	24	14	2	2	..	..	44
23	..	7 (6)	5 (4)	4 (3)	..	1 (1)	17 (14)	..	8 (7)	1 (1)	1 (1)	..	10 (9)	..	15	6	5	..	1	..	27
24	1 (1)	5 (5)	2 (2)	1 (1)	..	..	9 (9)	..	5 (5)	2 (2)	1 (1)	..	8 (8)	1	10	4	2	..	..	..	17
25	..	5 (5)	1 (1)	..	1 (1)	..	7 (7)	..	2 (2)	1 (1)	..	..	3 (3)	..	7	2	..	1	..	..	10
26	..	3 (3)	1 (1)	..	..	..	4 (4)	..	..	..	..	..	..	..	3	1	..	..	..	..	4
27	..	..	1((1)	1 (1)	..	..	2 (2)	..	..	..	..	..	..	..	..	1	1	..	..	..	2
28	..	..	1 (1)	..	..	..	1 (1)	..	1 (1)	..	2 (2)	..	3 (3)	..	1	1	2	..	..	..	4
29	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
30	..	..	..	1 (1)	..	..	1 (1)	..	..	..	..	..	..	..	..	..	1	..	..	..	1
31	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
32	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
33	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
34	..	..	..	..	..	..	..	..	..	..	1 (1)	..	1 (1)	..	..	..	1	..	..	..	1
Total	43	136	29	9	3	1	221	40	111	27	5	7	190	83	247	56	14	3	1	7	411
Average length	17.9	20.1	22.2	24.1	23.0	23.0	—	18.1	20.1	21.4	27.4	19.3	—	18.0	20.10	21.8	25.3	23.0	23.0	19.3	20.10

23. Sept. 1922 — Station 2826, 55°00′ N. Lat. 7°44′ E. Long., Depth: 21 m — Duration of fishing: 1h.

Sex	♂					♀					♂+♀					
Age-group	I	II	III	IV	Total	I	II	III	V	Total	I	II	III	IV	V	Total
Length cm																
12	..	..	..	..	..	2	..	..	..	2	2	..	..	..	..	2
13	1	..	..	..	1	1	1	..	..	2	2	1	..	..	..	3
14	2	..	..	..	2	2	2	..	..	4	4	2	..	..	..	6
15	2	3	..	..	5	1	1	..	..	2	3	4	..	..	..	7
16	2	6	..	..	8	..	1	..	..	1	2	7	..	..	..	9
17	..	1	..	..	1	..	2	2	..	4	..	3	2	..	..	5
18	..	1	1	..	2	..	..	3	..	3	..	1	4	..	..	5
19	..	..	1	1	2	..	..	..	..	..	..	..	1	1	..	2
20	..	..	..	..	..	..	..	1	..	1	..	..	1	..	..	1
21	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
22	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
23	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
24	..	..	..	..	..	..	..	..	1	1	..	..	..	..	1	1
Total	7	11	2	1	21	6	7	6	1	20	13	18	8	1	1	41
Average length	14.7	16.0	18.5	19.0	16.0	13.3	15.1	18.0	24.0	15.9	14.1	15.7	18.1	19.0	24.0	15 9

23. Sept. 1922 — Station 2825, 55°00′ N. Lat. 7°22′ E. Long., Depth: 26 m — Duration of fishing: 1h.

Sex	♂							♀						♂+♀						
Age-group	I	II	III	IV	V	VI	Total	I	II	III	IV	V	Total	I	II	III	IV	V	VI	Total
Length cm																				
13	1 (1)	1 (1)	..	..	..	..	2 (2)	..	..	..	..	..	..	1	1	..	..	..	..	2
14	..	3 (3)	..	..	..	..	3 (3)	1 (1)	5 (5)	..	..	..	6 (6)	1	8	..	..	..	..	9
15	..	4 (4)	1 (1)	..	..	..	5 (5)	2 (2)	5 (5)	1 (1)	..	..	8 (8)	2	9	2	..	..	..	13
16	..	24 (8)	9 (3)	..	..	..	33 (11)	..	15 (5)	3 (1)	..	..	18 (6)	..	39	12	..	..	..	51
17	..	10 (5)	15 (7)	..	..	..	25 (12)	2 (1)	6 (3)	8 (4)	..	..	16 (8)	2	16	23	..	..	..	41
18	..	4 (2)	10 (5)	..	..	..	14 (7)	..	4 (2)	18 (9)	..	..	22 (11)	..	8	28	..	..	..	36
19	..	2 (2)	5 (5)	1 (1)	..	..	8 (8)	..	4 (4)	10 (10)	1 (1)	..	15 (15)	..	6	15	2	..	..	23
20	..	1 (1)	4 (4)	1 (1)	..	..	6 (6)	..	..	4 (4)	..	..	4 (4)	..	1	8	1	..	..	10
21	..	2 (2)	2 (2)	2 (2)	..	1 (1)	7 (7)	..	..	3 (3)	..	..	3 (3)	..	2	5	2	..	1	10
22	..	..	3 (3)	..	1 (1)	..	4 (4)	..	..	1 (1)	..	1 (1)	2 (2)	..	..	4	..	2	..	6
23	..	..	..	..	..	..	..	..	..	1 (1)	..	..	1 (1)	..	..	1	..	..	..	1
24	..	..	..	1 (1)	..	..	1 (1)	..	..	1 (1)	1 (1)	..	2 (2)	..	..	1	2	..	..	3
25	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
26	..	..	..	..	1 (1)	..	1 (1)	..	..	..	..	..	..	..	..	..	..	1	..	1
27	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
28	..	..	..	..	..	..	..	..	..	1 (1)	..	..	1 (1)	..	..	1	..	..	..	1
29	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
30	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
31	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
32	..	..	..	..	..	..	..	..	..	..	..	1 (1)	1 (1)	..	..	..	..	1	..	1
Total	1	51	49	5	2	1	109	5	39	51	2	2	99	6	90	100	7	4	1	208
Average length	13.0	16.5	17.9	21.0	24.0	21.0	—	15.6	16.3	18.7	21.5	27.0	—	15.2	16.4	18.3	21.1	25.5	21.0	17.63

23. Sept. 1922 — Station 2827, 55°00′ N. Lat. 8°06′ E. Long., Depth: 16 m — Duration of fishing: ½h.

Sex	♂					♀				♂+♀					
Age-group	I	II	III	?	Total	I	II	III	Total	0	I	II	III	?	Total
Length cm															
4	..	..	..	..	..	..	..	..	..	4	..	..	..	..	4
5	..	..	..	..	..	..	..	..	..	44	..	..	..	..	44
6	..	..	..	..	..	..	..	..	..	153	..	..	..	..	153
7	..	..	..	..	..	..	..	..	..	93	..	..	..	..	93
8	..	..	..	..	..	..	..	..	..	1	..	..	..	..	1
9	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
10	2	..	..	..	2	..	..	..	..	..	2	..	..	..	2
11	..	..	..	..	..	1	..	..	1	..	1	..	..	..	1
12	4	..	..	..	4	1	..	..	1	..	5	..	..	..	5
13	1	2	..	..	3	2	..	..	2	..	3	2	..	..	5
14	3	8	..	1	12	2	1	..	3	..	5	9	..	1	15
15	..	2	..	..	2	..	3	3	6	..	..	5	3	..	8
16	..	3	1	..	4	..	3	1	4	..	..	6	2	..	8
17	..	3	..	..	3	..	2	..	2	..	..	5	..	..	5
18	1	..	..	..	1	..	..	1	1	..	1	..	1	..	2
19	..	..	..	..	..	..	..	1	1	..	..	..	1	..	1
20	..	..	..	..	..	..	..	1	1	..	..	..	1	..	1
Total	11	18	1	1	31	6	9	7	22	295	17	27	8	1	348
Average length	12.8	14.8	16.0	14.0	14.1	12.8	15.7	16.9	15.3	6.15	12.8	15.1	16.8	14.0	7.43

25. Sept. 1922 — Station 2828, 55°10′ N. Lat. 8°13′ E. Long., Depth: 10 m — Duration of fishing: 1h.

Sex	♂					♀						♂+♀						
Age-group	I	II	III	?	Total	I	II	III	IV	?	Total	0	I	II	III	IV	?	Total
Length cm																		
4	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	1
5	..	..	..	..	..	..	..	..	..	..	..	14	..	..	..	..	..	14
6	..	..	..	..	..	..	..	..	..	..	..	23	..	..	..	..	..	23
7	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	1
8	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
9	..	..	..	..	..	1	..	..	..	..	1	..	1	..	..	..	..	1
10	2	..	..	..	2	6	..	..	..	..	6	..	8	..	..	..	..	8
11	3	1	..	..	4	6	..	..	..	..	6	..	9	1	..	..	..	10
12	4	3	..	..	7	2	..	..	..	..	2	..	6	3	..	..	..	9
13	3	1	..	1	5	3	..	..	..	..	3	..	6	1	..	..	1	8
14	..	1	..	..	1	3	2	..	..	..	5	..	3	3	..	..	..	6
15	..	2	..	..	2	..	2	1	..	..	3	..	..	1	1	..	..	5
16	..	..	..	..	..	..	1	2	..	1	4	..	..	1	2	..	1	4
17	..	2	..	..	2	1	1	..	..	..	2	..	1	3	..	..	..	4
18	..	..	..	..	..	..	1	1	1	..	3	..	..	1	1	1	..	3
19	..	..	..	..	..	..	..	..	1	..	1	..	..	..	..	1	..	1
20	..	..	1	..	1	..	..	..	..	..	..	..	..	..	1	..	..	1
21	..	..	1	..	1	..	..	..	..	..	..	..	..	..	1	..	..	1
Total	12	10	2	1	25	22	7	4	2	1	36	39	34	17	6	2	2	100
Average length	11.7	13.8	20.5	13.0	13.3	11.7	15.6	16.3	18.5	16.0	13.4	5.6	11.7	14.5	17.7	18.5	14.5	10.35

25. Sept. 1922 — Station 2829, 55°10′ N. Lat. 7°55′ E. Long., Depth: 19 m — Duration of fishing: 1h.

Sex	♂						♀							♂+♀							
Age-group	I	II	III	IV	?	Total	I	II	III	IV	V	?	Total	0	I	II	III	IV	V	?	Total
Length cm																					
4	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	1
5	..	..	..	..	..	..	..	..	..	..	..	..	..	107	..	..	..	..	..	..	107
6	..	..	..	..	..	..	..	..	..	..	..	..	..	417	..	..	..	..	..	..	417
7	..	..	..	..	..	..	..	..	..	..	..	..	..	163	..	..	..	..	..	..	163
8	..	..	..	..	..	..	..	..	..	..	..	..	..	6	..	..	..	..	..	..	6
9	1	..	..	..	..	1	..	..	..	..	..	..	..	..	1	..	..	..	..	..	1
10	1	..	..	..	..	1	2	..	..	..	..	..	2	..	3	..	..	..	..	..	3
11	12	..	..	..	..	12	11	..	..	..	..	..	11	..	23	..	..	..	..	..	23
12	30 (15)	4 (2)	..	..	..	34 (17)	46 (23)	..	..	..	..	..	46 (23)	..	76	4	..	..	..	..	80
13	30 (15)	16 (8)	..	..	..	46 (23)	39 (19)	6 (3)	..	..	..	..	45 (22)	..	69	22	..	..	..	..	91
14	31 (10)	49 (16)	..	..	..	80 (26)	24 (8)	31 (10)	..	..	..	..	55 (18)	..	55	80	..	..	..	..	135
15	5 (3)	33 (18)	2 (1)	..	..	40 (22)	4 (2)	46 (25)	2 (1)	..	..	..	52 (28)	..	9	79	4	..	..	..	92
16	1 (1)	18 (18)	4 (4)	1 (1)	..	24 (24)	2 (2)	36 (36)	5 (5)	..	..	1 (1)	44 (44)	..	3	54	9	1	..	1	68
17	1 (1)	7 (7)	11 (11)	1 (1)	1 (1)	21 (21)	..	18 (18)	6 (6)	..	..	..	24 (24)	..	1	25	17	1	..	1	45
18	..	5 (5)	7 (7)	..	..	12 (12)	..	11 (11)	19 (19)	..	..	..	30 (30)	..	..	16	26	..	..	..	42
19	..	5 (5)	5 (5)	1 (1)	..	11 (11)	..	2 (2)	8 (8)	..	..	..	10 (10)	..	..	7	13	1	..	..	21
20	..	1 (1)	1 (1)	1 (1)	..	3 (3)	..	3 (3)	3 (3)	2 (2)	+	..	8 (8)	..	..	4	4	3	..	..	11
21	..	..	3 (3)	..	..	3 (3)	..	2 (2)	3 (3)	1 (1)	..	..	6 (6)	..	..	2	6	1	..	..	9
22	..	..	1 (1)	1 (1)	..	2 (2)	..	..	..	3 (3)	..	..	3 (3)	..	..	..	1	4	..	..	5
23	..	..	..	1 (1)	..	1 (1)	..	..	..	1 (1)	..	..	1 (1)	..	..	..	..	2	..	..	2
24	..	..	..	..	..	..	..	..	2 (2)	..	..	..	2 (2)	..	..	..	2	..	..	..	2
25	..	..	..	1 (1)	..	1 (1)	..	..	..	..	2 (2)	..	2 (2)	..	..	..	..	1	2	..	3
26	..	..	..	..	..	..	..	..	1 (1)	1 (1)	..	..	2 (2)	..	..	..	1	1	..	..	2
27	..	..	..	1 (1)	..	1 (1)	..	..	..	..	..	..	..	..	..	..	..	1	..	..	1
28	..	..	..	..	..	..	..	..	..	..	1 (1)	..	1 (1)	..	..	..	..	..	1	..	1
29	..	..	..	..	..	..	..	..	..	..	1 (1)	..	1 (1)	..	..	..	..	..	1	..	1
30	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
31	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
32	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
33	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
34	..	..	..	..	..	..	..	..	..	..	1 (1)	..	1 (1)	..	..	..	..	..	1	..	1
Total	112	138	34	8	1	293	128	155	49	8	5	1	346	694	240	293	83	16	5	2	1333
Average length	12.9	14.85	17.9	21.1	17.0	—	12.8	15.63	18.4	22.0	28.2	16.0	—	6.10	12.80	15.26	18 2	21.6	28.2	16.5	10.353

25. Sept. 1922 — Station 2830, 55°10′ N. Lat. 7°35′ E. Long., Depth: 22 m — Duration of fishing: 1h.

Sex	♂								♀						♂+♀							
Age-group	I	II	III	IV	V	VI	?	Total	I	II	III	IV	?	Total	0	I	II	III	IV	V	VI	?	Total
Length cm																							
6	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	1
7	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2	..	..	..	..	..	..	..	2
8	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
9	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
10	2	..	..	..	..	..	..	2	2	..	..	..	..	2	..	4	..	..	..	..	..	..	4
11	29 (2)	..	..	..	..	..	..	29 (2)	..	..	..	..	..	..	..	29	..	..	..	..	..	..	29
12	18 (6)	11 (4)	..	..	..	..	..	29 (10)	23 (8)	6 (2)	..	..	..	29 (10)	..	41	17	..	..	..	..	..	58
13	39 (20)	28 (14)	..	..	..	..	..	67 (34)	14 (7)	20 (10)	..	..	..	34 (17)	..	53	48	..	..	..	..	..	101
14	18 (6)	68 (23)	3 (1)	..	..	..	..	89 (30)	9 (3)	39 (13)	..	..	..	48 (16)	..	27	107	3	..	..	..	..	137
15	6 (2)	57 (20)	6 (2)	..	..	..	..	69 (24)	11 (4)	40 (14)	3 (1)	..	..	54 (19)	..	17	97	9	..	..	..	..	123
16	6 (3)	29 (15)	5 (3)	..	..	..	..	40 (21)	4 (2)	21 (11)	6 (3)	..	..	31 (16)	..	10	50	11	..	..	..	..	71
17	..	17 (17)	8 (8)	..	..	..	..	25 (25)	..	11 (11)	5 (5)	..	..	16 (16)	..	..	28	13	..	..	..	..	41
18	..	9 (9)	1 (1)	1 (1)	..	..	1 (1)	12 (12)	2 (2)	5 (5)	6 (6)	1 (1)	..	14 (14)	..	2	14	7	2	..	..	1	26
19	..	1 (1)	3 (3)	..	..	..	..	4 (4)	..	3 (3)	4 (4)	1 (1)	..	8 (8)	..	..	4	7	1	..	..	..	12
20	..	..	6 (6)	..	..	..	..	6 (6)	..	..	6 (6)	..	..	6 (6)	..	..	..	12	..	..	..	..	12
21	..	..	4 (4)	1 (1)	..	..	..	5 (5)	..	1 (1)	3 (3)	3 (3)	1 (1)	8 (8)	..	..	1	7	4	..	..	1	13
22	..	1 (1)	..	..	1 (1)	..	..	2 (2)	..	..	4 (4)	..	..	4 (4)	..	..	1	4	..	1	..	..	6
23	..	..	..	..	..	..	..	..	..	..	4 (4)	..	..	4 (4)	..	..	..	4	..	..	..	..	4
24	..	..	..	..	..	..	..	..	..	..	1 (1)	2 (2)	..	3 (3)	..	..	..	1	2	..	..	..	3
25	..	..	..	..	1 (1)	..	..	1 (1)	..	..	2 (2)	..	..	2 (2)	..	..	..	2	..	1	..	..	3
26	..	..	..	..	..	1 (1)	..	1 (1)	..	..	..	..	..	..	..	..	..	..	..	..	1	..	1
27	..	..	..	..	..	..	..	..	..	..	..	1 (1)	..	1 (1)	..	..	..	..	1	..	..	..	1
28	..	..	..	..	1 (1)	..	..	1 (1)	..	..	..	..	..	..	..	..	..	..	..	1	..	..	1
Total	118	221	36	2	3	1	1	382	65	146	44	8	1	264	3	183	367	80	10	3	1	2	649
Aver. length	12.7	14.7	17.4	19.5	25.0	26.0	18.0	—	13.4	14.9	19.3	21.9	21.0	—	6.7	12.95	14.79	18.4	21.4	25.0	26.0	19 5	14.86

25. Sept. 1922 — Station 2831, 55°10′ N. Lat. 7°06′ E. Long., Depth: 30 m — Duration of fishing: 1h.

Sex	♂				♀				♂+♀			
Age-group	II	III	IV	Total	II	III	IV	Total	II	III	IV	Total
Length cm												
16	..	1	..	1	..	..	..	..	..	1	..	1
17	..	..	..	..	1	..	..	1	1	..	..	1
18	1	1	..	2	..	..	..	..	1	1	..	2
19	..	2	..	2	1	..	..	1	1	2	..	3
20	..	..	..	..	1	2	..	3	1	2	..	3
21	..	1	1	2	..	1	1	2	..	2	2	4
22	..	2	..	2	..	..	..	..	..	2	..	2
23	..	..	..	..	..	1	..	1	..	1	..	1
24	..	..	1	1	..	..	1	1	..	..	2	2
25	..	..	..	..	..	..	..	..	..	..	..	..
26	..	..	..	..	..	..	1	1	..	..	1	1
27	..	..	..	..	..	..	1	1	..	..	1	1
Total	1	7	2	10	3	4	4	11	4	11	6	21
Average length	18.0	19.6	22.5	20.0	18.7	21.0	24.5	21.6	18.5	20.1	23.8	20.9

26. Sept. 1922 — Station 2833, 55°27′5 N. Lat. 7°41′ E. Long., Depth: 22 m — Duration of fishing: 1h.

Sex	♂					♀				♂+♀					
Age-group	I	II	III	IV	Total	I	II	III	Total	0	I	II	III	IV	Total
Length cm															
6	..	..	..	..	..	..	..	..	..	3	..	..	..	..	3
7	..	..	..	..	..	..	..	..	..	9	..	..	..	..	9
8	..	..	..	..	..	..	..	..	..	3	..	..	..	..	3
9	2	..	..	..	2	..	..	..	..	..	2	..	..	..	2
10	5	..	..	..	5	4	..	..	4	..	9	..	..	..	9
11	6	..	..	..	6	5	1	..	6	..	11	1	..	..	12
12	5	7	..	..	12	3	5	..	8	..	8	12	..	..	20
13	2	10	..	..	12	1	4	..	5	..	3	14	..	..	17
14	2	3	..	..	5	2	7	..	9	..	4	10	..	..	14
15	2	7	..	..	9	..	4	..	4	..	2	11	..	..	13
16	3	5	..	..	8	2	2	..	4	..	5	7	..	..	12
17	3	2	1	..	6	..	1	..	1	..	3	3	1	..	7
18	..	2	..	..	2	..	1	..	1	..	..	3	..	..	3
19	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
20	..	1	..	..	1	..	1	1	2	..	..	2	1	..	3
21	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
22	..	1	..	..	1	..	..	..	..	..	..	1	..	..	1
23	..	..	..	..	..	..	..	1	1	..	..	..	1	..	1
24	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
25	..	..	..	1	1	..	..	..	..	..	..	..	..	1	1
Total	30	38	1	1	70	17	26	2	45	15	47	64	3	1	130
Average length	12.6	14.6	17.0	25.0	13.89	12.0	14.2	21.5	13.67	7.0	12.4	14.4	20.0	25.0	13.02

26. Sept. 1922 — Station 2834, 55°28′5 N. Lat. 8°10′ E. Long., Depth: 8 m — Duration of fishing: 1/2h.

Sex	♂						♀								♂+♀								
Age-group	I	II	III	IV	?	Total	I	II	III	IV	V	VI	?	Total	0	I	II	III	IV	V	VI	?	Total
Length cm																							
4	..	..	..	..	..	..	..	..	..	..	..	..	..	..	9	..	..	..	..	..	..	..	9
5	..	..	..	..	..	..	..	..	..	..	..	..	..	..	72	..	..	..	..	..	..	..	72
6	..	..	..	..	..	..	..	..	..	..	..	..	..	..	45	..	..	..	..	..	..	..	45
7	..	..	..	..	..	..	..	..	..	..	..	..	..	..	9	..	..	..	..	..	..	..	9
8	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2	..	..	..	..	..	..	..	2
9	28 (7)	..	..	..	..	28 (7)	12 (3)	..	..	..	..	..	..	12 (3)	..	40	..	..	..	..	..	..	40
10	22 (11)	..	..	..	..	22 (11)	20 (10)	4 (2)	..	..	..	..	..	24 (12)	..	42	4	..	..	..	..	..	46
11	16 (8)	16 (8)	..	..	..	32 (16)	10 (5)	21 (10)	..	..	..	..	2 (1)	33 (16)	..	26	37	..	..	..	..	2	65
12	52 (13)	48 (12)	..	..	..	100 (25)	16 (4)	63 (16)	..	..	..	..	..	79 (20)	..	68	111	..	..	..	..	..	179
13	54 (13)	45 (11)	..	..	4 (1)	103 (25)	25 (6)	79 (19)	..	..	..	..	..	104 (25)	..	79	124	..	..	..	..	4	207
14	24 (6)	65 (16)	4 (1)	..	..	93 (23)	29 (7)	70 (17)	..	..	..	..	..	99 (24)	..	53	135	4	..	..	..	..	192
15	18 (6)	51 (17)	6 (2)	..	..	75 (25)	18 (6)	59 (20)	3 (1)	..	..	..	..	80 (27)	..	36	110	9	..	..	..	..	155
16	6 (2)	59 (19)	..	..	..	65 (21)	9 (3)	49 (16)	6 (2)	..	..	..	..	64 (21)	..	15	108	6	..	..	..	..	129
17	4 (2)	26 (12)	9 (4)	2 (1)	..	41 (19)	9 (4)	28 (13)	9 (4)	..	..	..	..	46 (21)	..	13	54	18	2	..	..	..	87
18	2 (2)	9 (9)	4 (4)	1 (1)	..	16 (16)	..	6 (6)	5 (5)	1 (1)	..	..	..	12 (12)	..	2	15	9	2	..	..	..	28
19	..	6 (6)	1 (1)	1 (1)	..	8 (8)	..	13 (13)	4 (4)	1 (1)	..	..	..	18 (18)	..	..	19	5	2	..	..	..	26
20	..	2 (2)	2 (2)	..	..	4 (4)	..	8 (8)	2 (2)	..	1 (1)	..	..	11 (11)	..	..	10	4	..	1	..	..	15
21	..	1 (1)	1 (1)	..	..	2 (2)	..	3 (3)	3 (3)	1 (1)	..	..	..	7 (7)	..	..	4	4	1	..	..	..	9
22	..	..	..	1 (1)	..	1 (1)	..	1 (1)	..	..	..	1 (1)	..	2 (2)	..	..	1	..	1	..	1	..	3
Total	226	328	27	5	4	590	148	404	32	3	1	1	2	591	137	374	732	59	8	1	1	6	13181
Av. length	12.3	14.44	16.7	18.6	13.0	—	12.7	14.30	17.6	19.3	20.0	22.0	11.0	—	5.44	12.53	14.36	17.2	18.9	20.0	22.0	12.3	13.07

25. Sept. 1922 — Station 2832, 55°06′ N. Lat. 6°43′ E. Long., Depth: 36 m — Duration of fishing: 2h.

Sex	♂						♀					♂+♀					
Age-group	I	II	III	IV	V	Total	II	III	IV	V	Total	I	II	III	IV	V	Total
Length cm																	
18	..	2	1	..	..	3	3	..	..	..	3	..	5	1	..	..	6
19	..	2	1	..	..	3	1	2	..	..	3	..	3	3	..	..	6
20	1	3	1	..	..	5	..	2	..	..	2	1	3	3	..	..	7
21	..	..	6	..	1	7	..	5	1	1	7	..	..	11	1	2	14
22	..	..	7	2	..	9	3	6	1	..	10	..	3	13	3	..	19
23	..	..	5	1	1	7	1	1	..	1	3	..	1	6	1	2	10
24	..	..	6	2	..	8	1	1	2	..	4	..	1	7	4	..	12
25	..	1	1	1	..	3	..	1	2	..	3	..	1	2	3	..	6
26	..	..	3	..	2	5	..	..	..	1	1	..	..	3	..	3	6
27	..	1	3	1	..	5	..	1	1	..	2	..	1	4	2	..	7
Total	1	9	34	7	4	55	9	19	7	3	38	1	18	53	14	7	93
Average length	20.0	20.7	22.9	23.9	24.0	22.7	20.7	21.7	24.0	23.3	22.1	20.0	20.7	22.5	23.9	23.7	22.4

27. Sept. 1922 — Station 2835, 55°38′ N. Lat. 8°05′ E. Long., Depth: 8 m — Duration of fishing: ½h.

Sex	♂				♀				♂+♀				
Age-group	I	II	III	Total	I	II	III	Total	0	I	II	III	Total
Length cm													
4	..	..	..	..	..	..	..	..	4	..	..	..	4
5	..	..	..	..	..	..	..	..	78	..	..	..	78
6	..	..	..	..	..	..	..	..	37	..	..	..	37
7	..	..	..	..	..	..	..	..	2	..	..	..	2
8	..	..	..	..	..	..	..	..	..	..	..	..	..
9	..	..	..	..	..	..	..	..	..	..	..	..	..
10	1	..	..	1	2	..	..	2	..	3	..	..	3
11	1	..	..	1	1	..	..	1	..	2	..	..	2
12	4	2	..	6	2	1	..	3	..	6	3	..	9
13	2	2	..	4	..	3	..	3	..	2	5	..	7
14	3	2	..	5	5	3	..	8	..	8	5	..	13
15	1	3	..	4	1	5	..	6	..	2	8	..	10
16	2	3	..	5	1	5	..	6	..	3	8	..	11
17	..	..	..	..	..	1	..	1	..	..	1	..	1
18	1	..	..	1	..	1	..	1	..	1	1	..	2
19	..	..	..	..	..	1	..	1	..	..	1	..	1
20	..	..	..	..	..	..	1	1	..	..	..	1	1
21	..	..	..	..	..	..	..	..	..	..	..	..	..
22	..	..	1	1	..	..	..	..	..	..	..	1	1
Total	15	12	1	28	12	20	1	33	121	27	32	2	182
Average length	13.5	14.3	22.0	14.1	13.0	15.1	20.0	14.5	5.31	13.3	14.8	21.0	8.32

27. Sept. 1922 — Station 2836, 55°52′ N. Lat. 8°06′ E. Long., Depth: 15 m — Duration of fishing: 1h.

Sex	♂				♀					♂+♀					
Age-group	I	II	III	Total	I	II	III	IV	Total	0	I	II	III	IV	Total
Length cm															
4	..	..	..	..	..	..	..	..	..	11	..	..	..	..	11
5	..	..	..	..	..	..	..	..	..	111	..	..	..	..	111
6	..	..	..	..	..	..	..	..	..	38	..	..	..	..	38
7	..	..	..	..	..	..	..	..	..	4	..	..	..	..	4
8	..	..	..	..	..	..	..	..	..	3	..	..	..	..	3
9	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
10	2	..	..	2	1	..	..	..	5	..	3	..	..	..	3
11	4	..	..	4	4	..	..	..	1	..	8	..	..	..	8
12	2	..	..	2	3	1	..	..	4	..	5	1	..	..	6
13	4	..	..	4	5	..	..	..	4	..	9	..	..	..	9
14	5	5	..	10	6	3	..	..	9	..	11	8	..	..	19
15	2	2	..	4	4	1	1	..	6	..	6	3	1	..	10
16	1	1	..	2	2	5	..	..	7	..	3	6	..	..	9
17	..	5	..	5	1	1	1	..	3	..	1	6	1	..	8
18	1	3	..	4	2	2	2	..	6	..	3	5	2	..	10
19	..	2	1	3	..	2	1	..	3	..	..	4	2	..	6
20	..	..	1	1	..	2	..	..	2	..	..	2	1	..	3
21	..	2	..	2	..	..	2	..	2	..	..	2	2	..	4
22	..	..	1	1	..	1	1	..	2	..	..	1	2	..	3
23	..	..	..	..	..	..	1	..	1	..	..	..	1	..	1
24	..	..	..	..	..	1	..	..	1	..	..	1	..	..	1
25	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
26	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
27	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
28	..	..	..	..	..	..	..	1	1	..	..	..	..	1	1
Total	21	20	3	44	28	19	9	1	57	167	49	39	12	1	268
Average length	13.0	16.7	20.3	15.2	13.7	17.2	19.3	28.0	16.0	5.26	13.4	16.9	19.6	28.0	9.18

Table of Measurements B.

The following table records the measurements of lengths of marketable plaice landed in Esbjerg. The size-limit of plaice for sale in Denmark is 257 mm for the total length of the fish. For plaice landed in Esbjerg for export the size-limit is as follows:

From March 1st till Sept. 30th 240 mm
„ Oct. 1st till Febr. 28th (29th) 225 mm

The measurements of the table are given in centimetres with omission of fractions of a centimetre, so that for instance the frequency stated for 27 cm indicates the number of individuals of length between 27 and 28 cm.

Depth-Area	A_3											
Square-Area	M_{10}	N_{10}	N_9	N_9	N_9	M_9	N_9	N_9	M_9	N_9		N_9
Date of capture	5. X. 22	6. X. 22	26. X. 22	29. X. 22	30. X. 22	30. X. 22	30. X. 22	30. X. 22	30. X. 22	31. X. 22	Oct. 1922	1. XI. 22
Fishing-place	15 miles NW of Slugen	3 miles W of Hvide Sande	5 miles NW by W of Graa Deep Light-V.	8 miles W of Graa Deep	10 miles W by S Graa Deep	9 miles W of Graa Deep	7 miles W of Graa Deep	7 miles W of Graa Deep	9 miles W of Graa Deep	8 miles W of Graa Deep		4 miles SSW of Graa Deep
Depth in m	19	19	19	17	15	17	17	15	17	17		15
Weight of catch in kg	1500	900	400	500	600	750	750	1100	700	400		250
Weight of sample in kg	23	26	18	25	23.5	24	24.5	24.5	23	18		16
Length cm											Total	
21	..	..	..	..	7	..	..	1	1	..	9	..
22	15	..	9	..	33	..	1	7	3	18	86	20
23	22	..	6	1	42	7	15	26	10	20	149	32
24	33	..	18	13	38	20	24	29	26	28	229	25
25	29	23	27	28	31	29	31	34	33	16	281	15
26	13	18	24	25	13	34	21	21	23	14	206	13
27	10	21	14	30	2	20	19	18	11	10	155	3
28	8	17	4	20	..	14	12	5	9	7	96	1
29	3	10	3	5	1	5	5	8	7	..	47	1
30	2	5	1	5	..	1	4	..	7	1	26	..
31	..	7	..	..	..	1	..	..	..	..	8	..
32	..	5	..	..	..	..	..	..	..	..	5	..
33	1	2	..	1	..	..	..	..	..	..	4	..
34	..	1	..	..	..	..	..	..	..	..	1	..
Total number	136	110[2])	106	128	167	131	132	149	130	114	1303[2])	110
Average length cm[1])	24.74	27.64	25.23	26.43	23.63	25.86	25.59	24.99	25.58	24.46	25.335	23.88

Depth-Area	A_3							A_4	B_4			
Square-Area	N_9	N_9	N_9	N_9	N_9			N_{11}	M_{10}	M_{10}	M_{10}	M_{10}
Date of capture	1. XI. 22	9. XI. 22	9. XI. 22	9. XI. 22	10. XI. 22	Nov. 1922	Oct.-Nov. 1922	4. X. 22	23. IX. 22	24. IX. 22	24. IX. 22	24. IX. 22
Fishing-place	5 miles W by N of Graa Deep	8 miles W of Graa Deep	7 miles W of Graa Deep	8 miles W of Graa Deep	6 miles W by N of Graa Deep			2 miles W by N of Lyngvig Light	3 miles NW of Horns Reef	16 miles NNW of Slugen	20 miles NW of Slugen	20 miles NW by N of Slugen
Depth in m	15	15	15	15	15			19	36	21	20	26
Weight of catch in kg	150	500	350	450	1000			900	850	1000	500	500
Weight of sample in kg	16	21	22	23	21			25	31	26	21	30
Length cm						Total	Total					
21	..	..	..	..	..	..	9	..	..	..	..	..
22	..	16	22	9	8	75	161	..	..	3	1	..
23	2	23	21	28	28	134	283	..	2	10	11	10
24	26	33	27	30	34	175	404	4	12	15	23	32
25	29	22	28	23	29	146	427	14	28	23	21	22
26	23	19	26	21	20	122	328	21	27	32	13	40
27	4	11	13	14	8	53	208	17	22	29	10	17
28	6	6	3	11	4	31	127	8	20	11	8	14
29	2	3	1	4	3	14	61	11	10	3	2	8
30	1	1	..	1	1	4	30	6	8	4	2	4
31	..	..	..	..	..	..	8	9	1	..	2	..
32	..	1	..	..	..	1	6	4	4	..	..	..
33	..	..	..	..	..	..	4	2	1	..	..	..
34	..	..	..	..	..	..	1	..	..	..	..	1
35	..	..	..	..	..	..	..	..	1	..	..	..
36	..	..	..	..	..	..	..	1	1	1	..	..
37	..	..	..	..	..	..	1	..	..	..	..	..
38	..	..	..	..	..	..	..	1	1	..	..	..
39	..	..	..	..	..	..	..	..	..	..	..	..
40	..	..	..	..	..	..	..	1	..	..	..	..
Total number	93	135	141	141	135	755	2058	99	138	131	93	148
Average length cm[1])	25.34	24.67	24.50	24.93	24.64	24.65	25.084	27.89	26.96	25.93	25.42	25.84

[1]) The average lengths of the 'Table of Measurements' have to be corrected by adding 0.5 cm. [2]) 37 cm: 1 spec.

Depth-Area	B_4											
Square-Area	M_{10}	M_{10}	M_{10}	M_{10}	M_{10}	M_{10}	M_{10}	M_{10}	M_{10}	M_{10}	M_{10}	M_{10}
Date of capture	24. IX. 22	25. IX. 22	25. IX. 22	25. IX. 22	25. IX. 22	25. IX. 22	26. IX. 22	26. IX. 22	26. IX. 22	27. IX. 22	27. IX. 22	27. IX. 22
Fishing-place	21 miles NW by N of Slugen	20 miles NNW of Slugen	23 miles NW by N of Slugen	26 miles NNW of Slugen	22 miles NNW of Slugen	30 miles NNW of Slugen	20 miles NW of Slugen	23 miles NNW of Slugen	22 miles NNW of Slugen	20 miles NNW of Slugen	28 miles NNW of Slugen	20 miles NNW of Slugen
Depth in m	23	24	24	24	24	24	24	24	24	24	24	24
Weight of catch in kg.	2500	400	600	1500	700	900	500	600	550	600	800	450
Weight of sample in kg.	21.5	25	19	25	26	20	24	26	20	24	20	26
Length cm												
22	..	..	..	..	..	..	..	..	..	..	..	..
23	16	25	8	..	4	5	1	6	5	6	2	10
24	28	27	21	5	24	15	22	30	19	20	13	23
25	24	31	21	23	33	15	27	22	17	26	13	31
26	18	21	16	32	27	24	25	33	15	30	20	28
27	10	8	17	20	22	16	13	22	16	18	23	17
28	9	6	9	6	18	12	18	14	12	10	10	18
29	3	3	2	12	6	6	9	6	7	7	7	9
30	2	2	2	6	1	5	3	3	..	1	6	3
31	1	3	..	4	..	3	1	1	5	4	1	1
32	..	..	1	1	..	..	..	..	..	..	1	..
33	..	2	..	1	..	..	..	..	..	..	..	1
34	..	1	1	1	..	..	..	..	1	..	..	..
35	..	..	..	..	..	..	..	..	..	..	..	..
36	..	1	..	..	1	..	..	..	..	..	..	..
37	..	..	..	..	..	..	..	..	..	..	..	..
38	..	..	..	..	..	..	..	..	..	..	..	..
39	..	..	..	..	..	..	..	..	..	..	..	..
40	..	..	..	..	..	..	..	..	..	..	..	..
41	..	..	..	..	..	..	..	..	..	..	..	..
42	..	..	..	..	..	..	..	..	..	..	..	..
43	..	..	..	..	..	..	..	..	..	..	..	..
Total number	111	130	98	111	136	101	119	137	97	122	96	141
Average length cm	25.30	25.42	25.76	26.90	25.98	26.33	26.16	25.89	26.25	25.99	26.56	25.98

Depth-Area	B_4											
Square-Area	M_{10}	M_{10}	M_{10}	M_{10}	M_{10}	M_{10}		M_{10}	M_{10}	M_{10}	M_{10}	M_{10}
Date of capture	27. IX. 22	28. IX. 22	28. IX. 22	28. IX. 22	28. IX. 22	29. IX. 22	Sept. 1922	1. X. 22	1. X. 22	1. X. 22	1. X. 22	1. X. 22
Fishing-place	22 miles NNW of Slugen	20 miles NNW of Slugen	5 miles NNW of Horns Reef	3 miles NW of Horns Reef	25 miles WbyS of Lyngvig Ligth	25 miles NNW of Slugen		30 miles NNW of Slugen	4 miles NW of Horns Reef Ligth-V.	22 miles NNW of Slugen	24 miles NNW of Slugen	20 miles NNW of Slugen
Depth in m	24	24	36	36	26	26		26	36	36	24	24
Weight of catch in kg.	900	450	600	450	500	650		1250	1000	500	1500	1250
Weight of sample in kg.	22	23	19	24	18	23		21	22	23	21	19
Length cm							**Total**					
22	..	..	..	..	..	..	4	..	..	..	..	..
23	..	3	12	..	13	10	159	25	6	28	14	8
24	6	11	5	1	10	26	388	26	17	33	30	18
25	20	27	18	12	25	21	500	24	7	27	21	27
26	40	29	18	12	27	26	553	21	18	15	22	10
27	24	24	15	22	21	20	406	12	17	6	15	17
28	14	12	10	15	12	13	271	3	16	8	6	7
29	2	9	7	20	2	4	144	3	7	6	8	3
30	1	..	2	7	4	1	67	2	7	1	3	3
31	..	..	1	2	1	..	31	..	2	3	..	..
32	..	..	1	2	..	..	10	..	..	..	..	2
33	..	..	..	4	..	..	9	2	..	..	..	..
34	..	..	..	1	1	..	7	..	2	1	..	..
35	..	..	..	..	..	..	1	..	..	..	..	1
36	..	..	..	1	..	..	5	..	1	..	..	..
37	..	..	..	1	..	..	1	..	..	..	..	..
38	..	..	..	..	..	..	1	..	..	..	..	..
39	..	..	..	..	..	..	..	..	..	..	..	..
40	..	..	..	..	..	..	..	..	..	..	..	..
41	..	..	..	..	..	..	..	..	..	..	..	..
42	..	..	..	..	..	..	..	..	..	..	..	..
43	..	..	..	..	..	..	..	..	..	..	..	..
Total number	107	115	89	100	116	121	2557	118	100	128	119	96
Average length cm	26.28	26.15	26.12	28.05	25.97	25.66	26.115	25.14	26.75	25.14	25.50	25.85

Depth-Area	B_4											
Square-Area	M_{10}	M_{10}	M_{10}	M_{10}	M_{10}	M_{10}	M_{10}	M_{10}	M_{10}	M_{10}	M_{10}	M_{10}
Date of capture	1. X. 22	1. X. 22	1. X. 22	2. X. 22	2. X. 22	2. X. 22	2. X. 22	2. X. 22	2. X. 22	3. X. 22	3. X. 22	3. X. 22
Fishing-place	24 miles NNW of Slugen	20 miles NNW of Slugen	5 miles NNW of Horns Reef	22 miles NNW of Slugen	22 miles NNW of Slugen	5 miles NW of Horns Reef	20 miles NNW of Slugen	20 miles NNW of Slugen	6 miles NNW of Horns Reef	20 miles NNW of Slugen	23 miles NNW of Slugen	3 miles NW of Horns Reef
Depth in m	26	24	32	24	24	36	24	24	34	26	26	32
Weight of catch in kg	850	600	900	2000	500	750	1600	500	1000	1350	800	1000
Weight of sample in kg	22	25	23	22	18	25	24	23	23	23	24	26
Length cm												
22	..	..	..	25	7	..	3	3	..	..	3	..
23	25	9	2	34	11	2	13	28	1	4	12	..
24	26	36	4	45	26	5	42	40	13	13	36	10
25	18	24	15	13	19	17	18	20	20	26	27	19
26	17	23	22	7	18	20	21	24	18	23	24	22
27	13	21	17	5	5	25	15	16	24	20	14	22
28	4	13	17	8	7	19	7	3	17	14	6	20
29	4	2	15	1	2	19	6	3	9	2	4	14
30	3	2	8	2	1	2	4	1	5	6	2	8
31	2	2	2	..	2	3	..	..	3	4	..	3
32	..	..	1	..	1	1	1	..	..	1	2	1
33	..	..	1	..	1	2	..	..	2	..	2	..
34	..	..	1	..	..	1	1	..	..	..	..	..
35	..	..	..	..	..	..	..	..	..	..	..	..
36	..	..	..	..	..	..	..	..	..	..	..	..
37	..	..	..	..	..	..	..	..	..	..	..	..
38	..	..	..	..	..	..	..	..	..	..	..	..
39	..	..	..	..	..	..	..	..	..	..	..	..
40	..	..	..	..	..	..	..	..	..	..	..	..
41	..	..	..	..	..	..	..	..	..	..	..	..
42	..	..	..	..	..	..	..	..	..	..	..	..
43	..	..	..	..	..	..	..	..	..	..	..	..
Total number	112	132	106[1])	140	100	116	131	138	112	113	132	119
Average length cm	25.20	25.61	27.42	24.05	25.20	27.19	25.42	24.83	26.76	26.35	25.43	26.99

Depth-Area	B_4											
Square-Area	M_{10}	M_{10}	M_{10}	M_{10}	M_{10}	M_{10}	M_{10}	M_{10}	M_{10}	M_{10}	M_{10}	M_{10}
Date of capture	3. X. 22	4. X. 22	4. X. 22	4. X. 22	4. X. 22	4. X. 22	4. X. 22	4. X. 22	4. X. 22	4. X. 22	4. X. 22	4. X. 22
Fishing-plaice	6 miles NW of Horns Reef	20 miles NW by N of Slugen	20 miles NNW of Slugen	18 miles NNW of Slugen	25 miles NNW of Slugen	18 miles NW by N of Slugen	4 miles NW of Horns Reef	25 miles NNW of Slugen	24 miles NNW of Slugen	25 miles NNW of Slugen	20 miles NW by N of Slugen	24 miles NNW of Slugen
Depth in m	34	26	26	24	26	24	32	26	26	26	26	24
Weight of catch in kg	500	1500	1500	1500	1250	1000	1050	900	900	1400	1000	1000
Weight of sample in kg	25	23	25	24	27	23	19	19	25	24	23	24
Length cm												
22	5	..	5	..	..	2	..	5	9	..	9	..
23	10	3	30	5	5	26	16	21	21	3	27	4
24	20	18	53	19	13	35	18	33	31	21	30	22
25	18	22	36	23	34	37	13	19	24	31	16	30
26	18	19	28	25	36	22	21	15	29	25	18	34
27	16	31	5	23	18	7	9	4	7	18	10	21
28	20	8	5	9	14	4	8	4	9	15	6	10
29	6	7	4	9	8	2	10	5	5	8	3	6
30	5	4	2	1	6	..	1	1	3	3	1	3
31	3	1	..	4	..	..	..	1	1	1	2	1
32	2	..	1	1	..	..	..	..	..	..	..	..
33	1	..	..	..	..	..	1	..	1	..	..	..
34	..	..	..	1	..	..	..	..	1	..	..	..
35	..	1	..	..	..	..	..	..	..	..	..	..
36	..	..	..	..	..	..	..	..	..	..	..	..
37	..	..	..	..	..	..	..	..	..	..	..	..
38	1	..	..	..	..	..	1	..	..	..	..	..
39	..	..	..	..	..	..	..	..	..	..	..	..
40	..	..	..	..	..	..	..	..	..	..	..	..
41	..	..	..	..	..	..	..	..	..	..	..	..
42	..	..	..	..	..	..	..	..	..	..	..	..
43	..	..	..	..	..	..	..	..	..	..	..	..
Total number	125	114	169	120	134	135	98	108	141	125	122	131
Average length cm	26.26	26.27	24.75	26.25	26.14	24.73	25.81	24.78	25.20	26.06	24.79	25.92

[1]) 46 cm: 1 spec.

Depth-Area	B_4											
Square-Area	M_{10}	M_{10}	M_{10}	M_{10}	M_{10}	M_{10}	M_{10}	M_{10}	M_{10}	M_{10}	M_{10}	M_{10}
Date of capture	4. X. 22	4. X. 22	4. X. 22	4. X. 22	4. X. 22	4. X. 22	5. X. 22	5. X. 22	5. X. 22	5. X. 22	5. X. 22	5. X. 22
Fishing-place	36 miles NW of Slugen	35 miles NW by N of Slugen	3 miles NW of Horns Reef	38 miles NW by N of Slugen	25 miles NW of Slugen	5 miles NW of Horns Reef	18 miles NNW of Slugen	25 miles NNW of Slugen	20 miles NNW of Slugen	20 miles NNW of Slugen	26 miles NW by N of Slugen	25 miles NNW of Slugen
Depth in m	24	36	36	28	26	36	24	24	24	24	24	34
Weight of catch in kg	500	1000	1000	1500	500	400	1000	1250	1500	1800	2000	1250
Weight of sample in kg	20	25	23	25	18	24	20	22	21	23	22	18
Length cm												
22	..	..	4	..	4	..	1	..	7	2	2	4
23	6	2	12	..	9	..	3	7	16	15	14	20
24	17	6	21	13	23	2	20	17	20	27	32	25
25	20	22	22	16	21	11	19	16	22	31	23	17
26	14	34	20	18	21	14	25	23	20	26	15	13
27	26	21	13	30	8	21	8	21	13	12	15	9
28	13	20	16	14	9	20	10	18	7	7	12	4
29	4	10	5	13	4	22	5	5	1	4	4	2
30	3	1	2	5	..	9	2	4	3	3	5	1
31	..	2	..	2	1	2	4	1	..	1	2	..
32	..	3	3	2	1	1	..	..	2	..	..	1
33	..	..	..	1	..	1	1	..	..	..	..	..
34	..	1	1	1	..	1	..	..	..	..	1	..
35	..	..	..	..	..	..	..	..	..	..	..	..
36	..	..	..	..	..	..	..	1	..	..	..	..
37	..	..	..	..	..	..	..	..	..	..	..	..
38	..	..	..	..	..	..	..	..	..	..	..	..
39	..	..	..	..	..	..	..	..	..	..	..	..
40	..	..	..	..	..	..	..	..	..	..	..	..
41	..	..	..	..	..	..	..	..	..	..	..	..
42	..	..	..	..	..	..	..	..	..	..	..	..
43	..	..	..	..	..	..	..	..	..	..	..	..
Total number	103	122	119	115	101	104	98	113	111	128	125	96
Average length cm	26.04	26.75	25.82	26.97	25.40	27.72	26.06	26.28	25.24	25.35	25.62	24.85

Depth-Area	B_4											
Square-Area	M_{10}	M_{10}	M_{10}	M_{10}	M_{10}	M_{10}	M_{10}	M_{10}	M_{10}	M_{10}	M_{10}	M_{10}
Date of capture	5. X. 22	5. X. 22	5. X. 22	5. X. 22	5. X. 22	6. X. 22	6. X. 22	6. X. 22	6. X. 22	6. X. 22	6. X. 22	6. X. 22
Fishing-place	18 miles NW by N of Slugen	8 miles NNW of Horns Reef	20 miles NW by N of Slugen	32 miles NW by N of Slugen	20 miles NNW of Slugen	10 miles NNW of Horns Reef	30 miles NNW of Slugen	7 miles NW $^1/_2$ N of Horns Reef	22 miles NNW of Slugen	19 miles NNW of Slugen	18 miles NW by N of Slugen	26 miles NNW of Slugen
Depth in m	26	32	24	30	26	30	26	36	26	26	26	23
Weight of catch in kg	1250	1000	1000	1500	750	600	500	400	1000	1500	1000	850
Weight of sample in kg	22.5	24	23.5	23	19	22.5	20	22	21	25	19.5	24
Length cm												
22	2	3	40	2	11	..	3	3	1	1	13	5
23	6	4	43	3	30	..	7	10	9	10	26	12
24	23	18	36	13	35	8	23	24	29	20	20	31
25	20	12	14	22	15	22	22	14	27	22	17	29
26	26	22	8	16	7	19	25	15	22	25	12	9
27	21	19	7	23	6	25	12	12	12	22	7	17
28	10	11	1	15	6	13	5	9	4	13	6	14
29	5	15	..	15	2	9	7	17	7	9	6	6
30	1	8	..	4	1	5	4	7	2	4	6	3
31	..	1	1	2	1	1	..	2	..	..	3	..
32	3	1	..	1	1	3	..	..	2	1	..	..
33	..	..	..	..	..	1	1	..	..	..	..	2
34	..	1	..	..	..	..	..	..	..	..	..	..
35	..	..	..	..	..	1	..	..	..	..	..	..
36	..	1	..	..	..	..	..	..	..	..	..	..
37	..	..	..	..	..	..	..	..	..	..	..	..
38	..	..	..	..	..	..	..	..	..	..	..	..
39	..	..	..	..	..	..	..	..	..	..	..	..
40	..	..	..	..	..	..	..	..	..	..	..	..
41	..	..	..	..	..	..	..	..	..	..	..	..
42	..	..	..	..	..	..	..	..	..	..	..	..
43	..	..	..	..	..	..	..	..	..	..	..	..
Total number	117	116	150	116	115	107	109	113	115	127	116	128
Average length cm	25.88	26.65	23.59	26.56	24.43	26.93	25.68	26.13	25.52	26.01	25.04	25.55

Depth-Area	B_4											
Square-Area	M_{10}	M_{10}	M_{10}	M_{10}	M_{10}	M_{10}	M_{10}	M_{10}	M_{10}	M_{10}	M_{10}	M_{10}
Date of capture	6. X. 22	7. X. 22	7. X. 22	7. X. 22	7. X. 22	7. X. 22	7. X. 22	8. X. 22	10. X. 22	10. X. 22	10. X. 22	10. X. 22
Fishing-place	18 miles NNW of Slugen	20—25 miles NNW of Slugen	19 miles NW of Slugen	6 miles NW of Horns Reef	20 miles NNW of Slugen	20 miles NW by N of Slugen	18 miles NW by N of Slugen	25 miles NW by N of Slugen	27 miles NNW of Slugen	18 miles W by N of Slugen	15 miles W of Lyngvig	18 miles NNW of Slugen
Depth in m	26	26	26	36	26	26	24	28	26	26	24	26
Weight of catch in kg	1000	1750	1000	600	1500	1000	500	1500	750	500	600	1000
Weight of sample in kg	22	25	18.5	22	22	23	22	22	23	19	25.5	22
Length cm												
22	1	12	17	2	7	10	1	6	3	24	..	23
23	10	28	20	2	25	33	17	13	17	37	1	26
24	37	41	20	21	29	30	29	14	24	28	4	17
25	19	26	23	14	25	29	32	26	25	12	7	24
26	19	18	9	18	15	10	17	20	26	12	16	16
27	14	3	6	15	12	7	11	15	14	6	9	6
28	5	4	5	9	5	9	4	10	7	5	7	4
29	5	3	..	17	4	8	8	7	3	2	14	7
30	4	5	4	4	2	1	3	3	4	2	9	1
31	2	1	..	2	1	1	2	1	..	..	12	..
32	1	..	1	2	..	..	..	1	1	..	5	1
33	..	1	..	..	1	..	..	..	2	..	3	1
34	..	..	..	..	..	..	..	..	1	..	2	..
35	..	..	..	..	..	1	..	..	..	..	..	..
36	..	..	..	..	..	..	..	1	..	..	2	..
37	..	..	..	..	..	..	..	..	..	..	..	..
38	..	..	..	..	..	..	..	..	..	..	..	..
39	..	..	..	1	..	..	..	..	..	..	1	..
40	..	..	..	..	..	..	..	..	..	..	..	..
41	..	..	..	..	..	..	..	..	..	..	..	..
42	..	..	..	..	..	..	..	..	..	..	..	..
43	..	..	..	..	..	..	..	..	..	..	..	..
Total number	117	142	105	107	126	139	124	117	127	128	92	126
Average length cm	25.52	24.68	24.54	26.61	24.95	24.84	25.35	25.76	25.57	24.09	28.64	24.60

Depth-Area	B_4											
Square-Area	M_{10}	M_{10}	M_{10}	M_{10}	M_{10}	M_{10}	M_{10}	M_{10}	N_{10}	M_{10}	M_{10}	M_{10}
Date of capture	10. X. 22	10. X. 22	10. X. 22	10. X. 22	10. X. 22	10. X. 22	10. X. 22	10. X. 22	10. X. 22	10. X. 22	10. X. 22	10. X. 22
Fishing-place	22 miles NNW of Slugen	25 miles NNW of Slugen	25 miles NNW of Slugen	22 miles NW of Slugen	25 miles NNW of Slugen	30 miles NW of Slugen	28 miles NNW of Slugen	32 miles NW of Slugen	4 miles WSW of Lyngvig	26 miles NNW of Slugen	36 miles NW of Slugen	35 miles NW of Slugen
Depth in m	26	26	26	26	26	34	24	34	24	26	36	36
Weight of catch in kg	700	1750	1000	1000	750	1000	1000	1750	500	1750	1500	1000
Weight of sample in kg	19.5	23	23.5	21	24	22.5	19.5	20	25	23	23	24
Length cm												
22	11	1	37	3	5	1	13	..	..	1	2	1
23	26	9	40	19	44	3	28	..	..	7	2	3
24	26	27	30	30	42	11	22	5	7	38	11	11
25	28	31	22	28	26	22	19	7	8	21	32	19
26	20	19	8	12	21	28	7	18	12	20	29	24
27	9	16	8	5	14	26	8	24	11	12	16	23
28	5	9	3	8	6	16	6	20	11	14	16	20
29	2	2	2	7	1	10	9	12	12	7	8	11
30	..	10	1	..	3	2	3	5	7	5	3	2
31	..	1	1	2	..	2	3	1	9	1	..	3
32	..	..	..	..	..	..	1	3	4	..	..	..
33	..	..	..	1	..	..	..	..	3	..	..	1
34	..	..	1	..	..	..	..	..	5	..	..	..
35	..	..	..	..	..	..	..	..	2	..	..	..
36	..	..	..	..	1	..	..	..	1	1	..	1
37	..	..	..	..	..	..	..	..	..	..	..	..
38	..	..	..	..	..	..	..	..	..	..	..	..
39	..	..	..	..	..	..	..	..	..	..	..	..
40	..	..	..	..	..	..	..	..	..	..	..	..
41	..	..	..	..	..	..	..	..	..	..	..	..
42	..	..	..	..	..	..	..	..	..	..	..	..
43	..	..	..	..	..	..	..	..	..	..	..	..
Total number	127	125	153	115	163	121	119	95	92	127	119	119
Average length cm	24.61	25.75	23.95	25.15	24.71	26.40	25.00	27.33	28.53	25.80	26.13	26.69

Depth-Area	B_4											
Square-Area	M_{10}	M_{10}	M_{10}	M_{10}	M_{10}	M_{10}	M_{10}	M_{10}	M_{10}	M_{10}	M_{10}	M_{10}
Date of capture	10. X. 22	12. X. 22	12. X. 22	12. X. 22	12. X. 22	12. X. 22	12. X. 22	12. X. 22	13. X. 22	13. X. 22	13. X. 22	14. X. 22
Fishing-place	30 miles NW by N of Slugen	30 miles N of Slugen	20 miles NW by N of Slugen	6 miles NW of Horns Reef	5 miles NNW of Horns Reef	32 miles N by W of Slugen	4 miles NW of Horns Reef	18 miles NW by N of Slugen	34 miles NW of Slugen	32 miles N by W of Slugen	30 miles NW of Slugen	35 miles NW of Slugen
Depth in m	28	28	24	34	34	28	36	26	38	30	34	34
Weight of catch in kg	1000	1000	1000	800	1750	1500	1000	1750	1750	1000	1000	1500
Weight of sample in kg	22.5	25	26.5	24	25	24	21.5	25	25	24	23	28
Length cm												
22	2	6	35	..	..	8	..	5	1	3	..	..
23	10	17	55	..	..	14	..	10	5	14	..	1
24	30	27	33	3	5	13	4	21	13	15	3	6
25	12	21	19	8	15	25	17	19	18	23	17	25
26	15	21	13	18	33	12	18	18	35	13	25	38
27	19	18	9	21	21	8	19	15	30	19	29	30
28	14	9	5	31	22	14	18	18	16	12	21	18
29	8	5	1	15	14	9	9	7	5	10	10	12
30	1	3	1	4	6	5	4	6	6	5	5	4
31	1	4	..	5	2	4	7	2	..	6	1	2
32	1	4	..	1	..	5	2	..	2	2	1	3
33	..	..	..	1	1	..	1	2	1	..	..	..
34	..	1	..	..	..	..	..	..	..	..	..	..
35	..	..	..	..	..	1	1	..	..	..	..	..
36	..	..	..	..	1	..	..	..	..	..	..	..
37	1	..	..	..	..	1	..	..	..	..	..	..
38	..	..	..	..	..	..	..	..	..	..	..	..
39	1	..	..	..	..	..	..	..	..	..	..	..
40	..	..	..	..	..	..	..	..	..	..	..	..
41	..	..	..	..	..	..	..	..	..	..	..	..
42	..	..	..	..	..	..	..	..	..	..	..	..
43	..	..	..	..	..	..	..	..	..	..	..	..
Total number	115	136	171	107	120	119	100	123	132	122	112	139
Average length cm	26.00	25.74	23.87	27.57	27.11	26.24	27.36	26.07	26.43	26.23	26.97	26.76

Depth-Area	B_4											
Square-Area	M_{10}	M_{10}	M_{10}	M_{10}	M_{10}	M_{10}	M_{10}	M_{10}	L_{10}	M_{10}	M_{10}	M_{10}
Date of capture	14. X. 22	15. X. 22	15. X. 22	15. X. 22	15. X. 22	16. X. 22	16. X. 22	19. X. 22	19. X. 22	20. X. 22	23. X. 22	23. X. 22
Fishing-place	35 miles NW of Slugen	35 miles NW of Slugen	35 miles NW of Slugen	30 miles NW of Slugen	30 miles NW of Slugen	6 miles NNW of Horns Reef	6 miles NW of Horns Reef	4 miles NW of Horns Reef	45 miles NW of Slugen	4 miles NNW of Horns Reef	6 miles NW of Horns Reef	6 miles NW of Horns Reef
Depth in m	32	34	30	30	26	34	34	36	32	32	36	45
Weight of catch in kg	1500	1400	1750	500	400	500	400	700	2000	500	1250	750
Weight of sample in kg	25	23.5	21	25.5	18	18.5	15.5	24	21.5	18.5	24	23
Length cm												
22	..	1	..	..	1	..	..	1	..	..	1	3
23	4	2	..	..	12	7	1	2	..	..	4	3
24	10	16	5	13	28	8	7	8	1	8	16	13
25	16	21	16	32	17	16	8	15	11	9	19	19
26	24	27	17	21	14	16	12	20	23	11	15	27
27	21	22	17	23	10	13	11	13	26	15	21	18
28	19	17	19	18	11	11	16	21	22	11	13	17
29	14	5	10	7	6	10	9	15	9	12	14	5
30	5	3	7	5	1	6	7	11	1	7	2	5
31	3	1	2	1	1	4	3	4	5	..	6	2
32	..	..	3	1	..	..	..	1	2	3	..	1
33	2	..	..	1	..	..	..	..	..	2	3	1
34	..	1	..	..	..	..	..	..	..	1	1	1
35	..	..	..	..	..	..	..	..	..	..	..	..
36	..	..	..	..	..	..	..	..	..	1	1	..
37	..	..	1	..	..	..	..	..	..	..	..	..
38	..	..	..	..	..	..	..	..	..	..	..	..
39	..	..	..	..	..	..	..	..	..	..	..	..
40	..	..	..	..	..	..	..	..	..	..	..	..
41	..	..	..	..	..	..	..	..	..	..	..	..
42	..	..	..	..	..	..	..	..	..	..	..	..
43	..	..	..	..	..	..	..	..	..	..	..	..
Total number	118	116	97	122	101	91	74	111	100	80	116	115
Average length cm	26.86	26.28	27.30	26.49	25.47	26.62	27.19	27.16	27.25	27.58	26.85	26.45

Depth-Area	B_4											
Square-Area	M_{10}	M_{10}	M_{10}	M_{10}	M_{10}	M_{10}	M_{10}	M_{10}	M_{10}	M_{10}	M_{10}	M_{10}
Date of capture	24. X. 22	24. X. 22	24. X. 22	24. X. 22	24. X. 22	25. X. 22	25. X. 22	25. X. 22	25. X. 22	25. X. 22	25. X. 22	25. X. 22
Fishing-place	5 miles NW of Horns Reef	30 miles NNW of Slugen	20 miles W of Lyngvig	30 miles N of Slugen	20 miles NNW of Horns Reef	6 miles NW of Horns Reef	6 miles NW of Horns Reef	25 miles NNW of Slugen	25 miles NNW of Slugen	30 miles NNW of Slugen	35 miles NW of Slugen	20 miles NNW of Slugen
Depth in m	36	24	24	26	32	36	36	24	24	26	30	23
Weight of catch in kg	1000	900	250	500	1250	600	500	1100	600	1200	700	1000
Weight of sample in kg	25	22	21.5	21	22	22.5	25	21	24	23	27	23
Length cm												
22	..	1	5	4	..	1	..	4	..	1	1	..
23	4	11	13	16	2	2	2	14	5	8	1	..
24	9	31	16	25	9	5	9	30	21	20	10	15
25	12	24	14	24	19	14	7	27	27	23	21	26
26	21	25	12	16	28	22	25	21	25	11	23	29
27	20	14	11	10	22	12	29	11	19	21	22	18
28	17	8	7	8	18	21	11	6	9	17	25	11
29	21	3	12	5	11	11	16	3	6	10	14	6
30	1	2	6	2	3	10	7	1	8	4	3	4
31	7	..	6	2	1	3	4	2	3	2	4	3
32	1	..	2	2	..	2	1	..	..	..	2	..
33	3	..	1	1	1	..	1	..	..	..	..	2
34	..	..	1	..	..	..	2	..	..	..	2	2
35	..	..	1	..	..	..	1	..	..	..	..	..
36	1	..	..	1	..	..	..	..	..	..	..	..
37	..	..	..	..	..	..	..	..	..	..	..	..
38	..	1	..	..	..	..	..	..	..	..	..	..
39	..	..	..	..	..	..	..	..	..	..	..	..
40	..	..	..	..	..	..	..	..	..	..	..	..
41	..	..	..	..	..	..	..	..	..	..	..	..
42	..	..	..	..	..	..	..	..	..	..	..	..
43	..	..	..	..	..	..	..	..	..	..	..	..
Total number	117	120	107	116	114	103	115	119	123	117	128	116
Average length cm	27.29	25.47	26.43	25.57	26.63	27.16	27.34	25.17	26.15	26.17	26.98	26.54

Depth-Area	B_4											
Square-Area	M_{10}	M_{10}	N_{10}	M_{10}	M_{10}	M_{10}		M_{10}	M_{10}	M_8	M_8	
Date of capture	25. X. 22	25. X. 22	25. X. 22	25. X. 22	28. X. 22	30. X. 22	Oct. 1922	1. XI. 22	1. XI. 22	1. XI. 22	10. XI. 22	Nov. 1922
Fishing-place	30 miles N of Slugen	30 miles NNW of Slugen	30 miles NNW of Slugen	32 miles NW of Slugen	4 miles NW of Horns Reef	4 miles NW of Horns Reef		18 miles NW of Slugen	6 miles NW of Horns Reef	50 miles SW by $W^1/_2W$ of Graa Deep	50 miles SW by W of Graa Deep	
Depth in m	26	30	24	34	36	36		30	36	28	32	
Weight of catch in kg	250	750	750	1250	500	700		400	500	350	1000	
Weight of sample in kg	21.5	21	20	24	21	28		18	20	20	22	
Length cm							**Total**					**Total**
22	..	1	2	2	3	2	459	3	..	2	1	6
23	1	9	1	2	5	9	1333	10	2	4	4	20
24	10	19	19	19	20	19	2402	8	13	27	10	58
25	18	18	19	30	14	23	2424	17	19	22	17	75
26	13	17	12	20	22	25	2331	27	14	21	33	95
27	15	22	15	20	14	21	1867	10	14	8	27	59
28	12	11	16	17	10	18	1387	13	14	7	13	47
29	8	5	6	11	10	10	908	3	8	9	5	25
30	4	4	4	5	6	5	445	5	3	3	5	16
31	5	..	1	1	2	1	224	1	5	2	2	10
32	3	1	4	..	1	4	114	1	3	..	..	4
33	2	1	..	..	..	..	60	..	2	3	..	5
34	2	1	..	1	1	1	41	..	..	1	..	1
35	1	..	..	..	..	..	11	..	1	..	..	1
36	..	..	..	..	..	..	15	..	..	..	..	..
37	..	..	..	..	..	..	3	..	..	..	..	..
38	..	..	..	..	..	..	3	..	..	..	..	..
39	..	..	..	..	..	..	3	..	..	..	..	..
40	..	..	..	..	..	..	..	..	..	..	..	..
41	..	..	..	..	..	..	..	..	..	..	..	..
42	..	..	..	..	..	..	..	..	..	..	..	..
43	..	..	..	..	..	..	..	..	..	..	..	..
Total number	94	109	99	128	108	138	14031[1])	98	98	109	117	422
Average length cm	27.28	26.08	26.42	26.30	26.29	26.35	25.930	26.01	26.95	26.04	26.38	26.34

[1]) 46 cm: 1 spec.

Depth-Area	B_4	B_5										
Square-Area		M_{11}	N_{11}	M_{11}	N_{11}	M_{11}	N_{11}	N_{11}	M_{12}	M_{11}	M_{11}	M_{11}
Date of capture	Sept.—Nov. 1922	4. X. 22	5. X. 22	8. X. 22	9. X. 22	10. X. 22	10. X. 22	10. X. 22	10. X. 22	11. X. 22	11. X. 22	12. X. 22
Fishing-place		40 miles NNW of Slugen	Off Lyngvig	40 miles N by W of Slugen	3 miles W of Lyngvig Light	40 miles NNW of Slugen	3 miles WSW of Lyngvig Light	3 miles W of Lyngvig	34 miles N by W of Lyngvig	45 miles N by W of Slugen	46 miles N by W of Slugen	48 miles N by W of Slugen
Depth in m		32	21	32	21	30	23	23	28	28	32	30
Weight of catch in kg		1500	800	2000	400	1000	650	700	850	1750	1500	1750
Weight of sample in kg		22	24	21	16	21	23.5	25	21	24	21	21
Length cm	**Total**											
22	469	..	..	..	..	2	..	..	..	1	..	..
23	1512	..	1	1	1	4	..	2	5	4	5	6
24	2848	5	11	8	3	13	1	6	8	17	21	7
25	2999	4	15	23	6	22	2	6	15	24	20	23
26	2979	15	11	26	3	17	7	17	20	29	17	20
27	2332	15	13	20	6	27	9	8	14	20	13	18
28	1705	20	10	11	6	13	14	7	9	13	14	11
29	1077	20	10	13	4	3	9	2	9	10	7	12
30	528	8	6	3	6	2	9	12	6	2	7	5
31	265	3	6	1	4	1	9	12	6	3	3	..
32	128	4	5	..	5	..	8	6	2	..	..	..
33	74	..	2	..	2	..	5	5	2	2	..	..
34	49	1	1	..	2	..	5	4	..	..	..	..
35	13	1	2	..	1	..	4	2	..	..	..	..
36	20	..	..	1	2	..	..	..	..	..	..	1
37	4	..	1	..	1	..	..	..	..	..	..	..
38	4	..	..	..	..	..	..	1	..	..	..	..
39	3	..	1	..	1	..	..	..	..	..	..	..
40	..	..	..	..	..	..	..	..	..	..	..	..
41	..	..	..	..	..	..	..	..	..	..	..	..
42	..	..	..	..	..	..	..	..	..	..	..	..
43	..	..	..	..	..	..	..	..	..	..	..	..
Total number	17010[1])	96	95	107	53	104	82	90	96	125	107	103
Average length cm	25.968	27.97	27.80	26.62	29.25	26.07	29.66	28.72	26.97	26.31	26.26	26.50

Depth-Area	B_5											
Square-Area	M_{11}	M_{11}	M_{11}	M_{11}	M_{11}	M_{11}	M_{11}	M_{11}	M_{11}	M_{11}	M_{11}	M_{11}
Date of capture	12. X. 22	12. X. 22	12. X. 22	12. X. 22	12. X. 22	12. X. 22	12. X. 22	12. X. 22	16. X. 22	16. X. 22	17. X. 22	17. X. 22
Fishing-place	46 miles N by W of Slugen	40 miles NNW of Slugen	43 miles N of Slugen	12 miles WNW of Lyngvig	45 miles N by W $^1/_2$ W of Slugen	22 miles WNW of Lyngvig	40 miles N $^1/_2$ W of Slugen	16 miles WNW of Lyngvig	50 miles N by W of Slugen	47 miles N by W of Slugen	45 miles N by W of Slugen	45 miles N by W of Slugen
Depth in m	32	30	30	30	28	28	28	30	32	30	30	30
Weight of catch in kg	1500	1750	2000	1750	2250	1750	2250	1000	1750	1000	1500	1000
Weight of sample in kg	25	23	18	26	20	24.5	24	23	25	21.5	24	23
Length cm												
22	4	8	..	2	..	..	2	3	1	..	2	2
23	8	17	4	2	..	..	7	5	11	..	9	4
24	21	18	13	7	11	9	19	22	18	2	34	11
25	30	21	10	10	7	25	28	27	23	18	42	25
26	35	23	15	17	21	23	23	14	18	27	25	32
27	20	15	21	27	22	34	19	20	21	28	14	23
28	14	9	9	25	16	16	11	11	19	15	2	12
29	5	9	10	13	14	13	12	11	7	12	5	9
30	2	1	4	5	4	3	7	5	5	2	4	3
31	..	..	..	3	..	2	1	1	1	..	1	1
32	1	1	..	3	..	1	1	..	3	..	1	1
33	..	..	1	2	..	..	..	..	1	1	1	..
34	..	..	..	2	..	..	..	2	..	..	..	..
35	..	..	1	..	..	..	..	..	..	..	..	..
36	..	..	..	..	..	..	..	..	..	..	..	..
37	..	..	..	..	..	..	..	..	..	..	..	..
38	..	..	..	..	..	..	..	..	..	..	..	..
39	..	..	..	..	..	..	..	..	..	..	..	..
40	..	..	..	..	..	..	..	..	..	..	..	..
41	..	..	..	..	..	..	..	..	..	..	..	..
42	..	..	..	..	..	..	..	..	..	..	..	..
43	..	..	..	..	..	..	..	..	..	..	..	..
Total number	140	122	88	118	95	126	130	121	128	105	140	123
Average length cm	25.75	25.43	26.60	27.36	26.87	26.71	26.16	26.15	26.27	26.83	25.44	26.24

[1]) 46 cm: 1 spec.

Depth-Area	B_5										
Square-Area	M_{11}	M_{11}	N_{11}	M_{11}	M_{11}	M_{11}	M_{11}	M_{11}	M_{11}	M_{11}	M_{11}
Date of capture	17. X. 22	17. X. 22	18. X. 22	18. X. 22	18. X. 22	18. X. 22	18. X. 22	19. X. 22	19. X. 22	19. X. 22	24. X. 22
Fishing-place	40 miles N by W of Slugen	45 miles N by W of Slugen	3 miles W of Lyngvig	48 miles N ½ W of Ringebjerg	45 miles N by W of Slugen	50 miles N ½ W of Slugen	15 miles WNW of Lyngvig	42 miles N by W of Slugen	50 miles N ½ W of Slugen	15 miles WNW of Lyngvig	44 miles N of Slugen
Depth in m	30	28	21	32	28	32	30	28	32	30	32
Weight of catch in kg.	500	1000	500	2500	1200	1500	1500	1500	2500	400	1500
Weight of sample in kg.	23	25	19.5	26	22.5	23	21.5	24.5	19.5	24	25
Length cm											
22	1	..	..	..	1	1	..	..	..	..	3
23	1	2	..	3	4	1	..	4	1	..	17
24	14	21	2	11	9	9	3	12	19	6	34
25	16	41	1	13	16	9	11	15	14	11	39
26	35	32	3	35	30	21	12	19	20	11	21
27	26	16	6	23	20	19	10	17	22	14	17
28	15	15	5	25	17	22	9	18	10	17	6
29	6	6	4	9	8	12	13	13	7	16	5
30	..	..	7	5	5	6	8	5	1	12	2
31	2	2	7	1	3	5	8	7	..	4	..
32	..	1	4	1	1	1	4	4	1	3	..
33	..	..	5	..	..	1	7	..	2	5	1
34	..	1	3	..	..	..	1	..	..	1	..
35	..	..	3	..	1	..	..	..	..	..	..
36	..	..	1	..	..	..	..	..	..	1	..
37	1	..	4	..	..	..	..	..	..	..	..
38	..	..	1	..	..	..	..	..	..	..	..
39	..	..	..	..	..	..	..	..	..	..	..
40	..	..	..	..	..	..	..	..	..	..	..
41	..	..	1	..	..	..	..	..	..	..	..
42	..	..	..	..	..	..	..	..	..	..	..
43	..	..	..	..	..	..	..	..	..	..	..
Total number	117	137	57	126	115	107	86	114	97	101	145
Average length cm.	26.38	25.99	30.86	26.69	26.68	27.19	28.36	27.05	26.33	28.10	25.23

Depth-Area	B_5										
Square-Area	M_{11}	M_{11}	M_{11}	M_{11}	M_{11}	M_{11}	M_{11}	M_{11}	M_{11}	M_{11}	
Date of capture	25. X. 22	25. X. 22	25. X. 22	25. X. 22	25. X. 22	26. X. 22	26. X. 22	26. X. 22	30. X. 22	30. X. 22	Oct. 1922
Fishing-place	34 miles N ½ E of Slugen	43 miles N of Slugen	15 miles WNW of Lyngvig	50 miles N of Slugen	44 miles N by W of Slugen	50 miles N by W of Slugen	40 miles N of Slugen	40 miles N of Slugen	48 miles NNW of Slugen	12 miles NW of Lyngvig	
Depth in m	30	30	30	32	32	30	32	26	32	26	
Weight of catch in kg.	400	1750	500	1000	1000	1000	300	750	1000	450	
Weight of sample in kg.	25	23	23	19.5	24.5	22	21.5	22	21	23	
Length cm											Total
22	8	..	..	6	1	..	2	..	..	..	50
23	17	4	..	16	8	3	3	7	2	..	189
24	29	15	10	24	20	11	10	22	10	1	577
25	27	22	25	15	37	26	24	28	13	4	833
26	22	23	18	12	29	26	29	22	23	6	904
27	18	25	12	14	17	29	22	23	11	10	798
28	8	13	14	13	12	12	9	9	15	12	563
29	2	9	10	4	5	8	9	7	9	7	388
30	5	3	5	..	4	3	1	2	7	10	202
31	..	3	4	2	1	2	4	..	2	9	121
32	..	1	2	3	1	..	..	..	4	12	85
33	1	2	1	1	..	..	..	2	1	3	56
34	1	..	1	..	..	..	..	..	2	1	31
35	1	..	1	..	..	..	1	..	..	2	20
36	1	..	..	..	..	..	..	..	..	..	7
37	..	..	3	..	..	..	..	1	..	1	12
38	..	..	..	..	..	..	..	..	..	1	3
39	..	..	..	..	..	..	..	..	..	..	2
40	..	..	..	..	..	..	..	..	..	..	..
41	..	..	..	..	..	..	..	..	..	..	1
42	..	..	..	..	..	..	..	..	..	..	..
43	..	..	..	..	..	..	..	..	..	..	..
Total number	140	120	106	110	135	120	114	123	99	82	4845
Average length cm.	25.47	26.51	27.26	25.56	25.84	26.35	26.34	26.02	27.15	29.66	26.696

Depth-Area	B_1											
Square-Area	H_9	H_9	I_9	K_{10}	H_{10}	I_9	H_9	H_9	I_9	I_9	H_9	H_9
Date of capture	1. X. 22	2. X. 22	2. X. 22	5. X. 22	9. X. 22	10. X. 22	10. X. 22	10. X. 22	12. X. 22	14. X. 22	14. X. 22	15. X. 22
Fishing-place	155 miles NE by E of Grimsby	167 miles W by N of Graa Deep	125 miles W by N of Graa Deep	90 miles WNW of of Horns Reef	170 miles W by N½N of Graa Deep	130 miles W by N of Graa Deep	160 miles W by N of Graa Deep	160 miles W by N of Graa Deep	127 miles W by N of Graa Deep	125 miles W by N of Graa Deep	153 miles W by N of Graa Deep	160 miles W by N of Graa Deep
Depth in m	40	33	32	38	38	30	36	40	30	32	28	32
Weight of catch in kg	3500	5000	1000	1500	5000	4500	2500	3000	5000	4000	3500	3000
Weight of sample in kg	35	35	35	35	35	35	35	35	26	35	35	35
Length cm												
22	..	..	..	..	..	..	..	..	..	..	..	..
23	..	..	..	..	..	..	..	..	..	..	..	..
24	..	..	..	..	..	..	..	..	..	..	..	..
25	..	..	..	..	..	..	..	..	..	..	..	..
26	..	..	..	..	..	..	..	..	..	..	..	..
27	..	..	..	..	..	..	..	..	5	..	..	..
28	..	..	..	..	..	..	..	..	2	..	1	..
29	..	..	..	..	..	..	..	..	6	..	..	..
30	..	..	..	..	..	..	..	..	8	..	..	..
31	..	..	..	..	..	..	..	..	5	..	..	..
32	..	1	..	..	..	..	..	..	7	..	..	..
33	..	..	..	..	1	..	..	..	8	..	..	..
34	..	..	..	1	..	1	..	..	4	1	1	..
35	..	1	5	1	..	4	..	..	4	1	..	..
36	..	..	7	4	..	9	2	1	6	3	2	..
37	..	..	4	6	..	15	1	..	4	7	3	1
38	..	..	4	7	..	10	2	..	3	6	6	1
39	1	..	2	11	..	9	2	..	..	7	5	..
40	1	2	7	2	2	3	2	1	..	2	4	2
41	2	..	3	1	1	3	..	1	..	2	2	1
42	1	2	1	..	2	2	1	2	1	4	..	1
43	3	..	1	2	3	2	4	3	..	1	1	1
44	..	..	1	3	1	1	2	1	..	2	2	1
45	2	..	1	1	2	..	1	..	1	1	1	1
46	3	1	..	1	2	2	1	3	..	..	..	..
47	2	1	..	2	3	1	..	2	..	2	1	1
48	..	5	..	1	2	1	1	..	..	..	1	1
49	2	1	..	..	2	..	3	3	..	..	..	2
50	3	2	1	..	4	..	7	2	..	1	3	4
51	1	3	..	1	2	..	1	1	..	..	1	2
52	3	2	1	1	2	..	2	1	..	..	..	2
53	..	..	3	1	1	..	..	2	..	4	2	1
54	..	..	..	..	..	..	..	2	..	..	1	1
55	3	2	..	..	1	..	..	..	..	..	..	2
56	..	..	..	..	..	..	1	..	..	..	..	..
57	..	..	..	..	..	..	..	..	..	..	..	..
58	1	..	..	..	..	..	..	..	..	..	..	..
59	..	..	..	..	..	..	..	..	..	..	..	..
60	2	3	..	..	1	..	1	1	..	..	1	..
61	..	1	..	..	..	..	..	..	..	..	..	..
62	..	..	..	1	..	..	..	..	..	..	..	1
63	..	..	..	..	..	..	..	1	..	..	..	..
64	..	..	..	..	..	..	..	..	..	..	..	..
65	..	..	..	..	..	..	..	..	..	1	..	..
Total number	30	27	41	47	32	63	34	27	64	45	38	26
Average length cm	48.40	48.93	40.07	40.85	46.94	38.54	45.65	47.89	32.64	41.42	42.16	48.00

Depth-Area	B_1									C_2		
Square-Area	I_9	H_9	I_9	I_9	I_{10}	I_9	H_9	I_9		L_9	K_9	K_9
Date of capture	15. X. 22	16. X. 22	16. X. 22	17. X. 22	18. X. 22	20. X. 22	20. X. 22	24. X. 22	Oct. 1922	23. IX. 22	23. IX. 22	24. IX. 22
Fishing-place	134 miles W by N of Graa Deep	165 miles NE by E of Humber	150 miles W by N of Graa Deep	150 miles W by N of Graa Deep	130 miles W by $N^1/_2N$ of Graa Deep	150 miles W by N of Graa Deep	140 miles NE by E of Humber	140 miles W by N of Graa Deep		75 miles W by N of Graa Deep	89 miles W by N of Graa Deep	88 miles W by N of Graa Deep
Depth in m	30	36	32	41	36	41	38	45		47	47	47
Weight of catch in kg	2000	2000	2500	2000	4500	750	1750	1250		800	1500	1000
Weight of sample in kg	35	35	35	35	35	35	35	32		35	36	45
Length cm									Total			
22	..	..	..	..	..	..	..	..	..	..	..	..
23	..	..	..	..	..	..	..	..	..	3	..	..
24	..	..	..	..	..	..	..	..	..	1	2	1
25	..	..	..	..	..	..	..	..	..	9	11	11
26	..	..	..	..	..	..	..	..	..	16	13	25
27	..	..	..	..	..	..	..	1	6	15	16	40
28	..	..	..	..	..	..	..	6	9	14	22	28
29	..	..	..	..	..	..	..	11	17	11	19	18
30	..	..	..	..	..	..	..	10	18	13	9	16
31	..	..	..	..	1	..	..	12	18	8	12	11
32	..	..	..	..	..	..	..	15	23	2	11	9
33	..	..	..	..	..	1	..	7	17	4	7	7
34	2	1	..	..	6	1	..	7	25	3	4	5
35	1	1	..	..	3	..	..	6	27	3	1	1
36	3	..	1	..	9	2	..	6	55	3	..	1
37	3	..	2	1	5	..	..	..	52	1	1	1
38	2	..	1	2	9	1	1	3	58	..	2	1
39	4	..	1	1	6	1	1	1	52	..	..	..
40	2	1	3	..	3	2	1	1	41	..	..	1
41	2	..	1	..	..	1	..	..	20	1	..	..
42	1	..	..	3	2	1	1	..	25	..	..	1
43	3	2	3	..	5	2	3	..	39	..	1	..
44	3	2	1	2	1	4	3	..	30	..	..	..
45	..	..	..	1	2	1	..	1	16	1	..	..
46	2	1	1	1	..	..	4	1	23	..	1	..
47	1	2	1	2	1	2	2	..	26	..	..	1
48	1	1	2	1	1	1	1	..	20	..	..	1
49	..	1	1	1	..	1	2	..	19	1	..	..
50	2	2	8	5	1	3	2	..	50	..	..	..
51	3	..	2	1	1	5	..	..	24	2	..	..
52	2	4	1	2	..	2	4	..	29	..	..	..
53	1	5	..	..	..	1	2	..	23	..	..	..
54	1	..	..	3	..	1	1	..	10	..	..	..
55	..	..	3	1	..	..	2	..	14	..	..	..
56	..	..	..	..	..	..	..	..	1	..	..	..
57	..	1	..	..	..	..	..	..	1	..	..	..
58	..	1	..	..	..	..	..	..	2	..	..	..
59	..	..	..	..	..	..	..	..	..	..	..	..
60	..	..	..	1	..	..	..	..	10	..	..	..
61	..	..	..	..	..	..	..	..	1	..	..	..
62	..	..	..	..	..	..	..	..	2	..	..	..
63	..	..	..	..	..	..	..	..	1	..	..	..
64	..	..	..	..	..	..	..	..	..	..	..	..
65	..	..	..	..	..	..	..	..	1	..	..	..
Total number	39	25	32	28	56	33	30	88	805	111	132	179
Average length cm	42.82	48.32	46.19	47.50	38.82	45.24	47.40	32.33	41.66	29.49	29.23	28.87

Depth-Area	C_2										
Square-Area	K_9	K_9	K_{10}	L_9	K_9	G_{10}	K_9		K_{11}	K_{10}	K_{12}
Date of capture	24. IX. 22	24. IX. 22	25. IX. 22	25. IX. 22	25. IX. 22	26. IX. 22	28. IX. 22	Sept. 1922	1. X. 22	5. X. 22	7. X. 22
Fishing-place	85 miles W by N of Graa Deep	85 miles W by N of Graa Deep	80 miles W by N of Slugen	75 miles W by N of Graa Deep	80 miles W by N of Graa Deep	200 miles W by N of Graa Deep	85 miles W by N of Graa Deep		85 miles NW½W of Horns Reef	93 miles W by N½N of Graa Deep	120 miles NW of Slugen
Depth in m	47	47	53	47	47	41	47		58	53	58
Weight of catch in kg	1750	600	1500	900	800	2500	300		2500	600	3000
Weight of sample in kg	30	30	33	27	24	35	26	**Total**	35	20.5	35
Length cm											
22	..	..	..	..	..	..	..	..	..	..	..
23	..	..	..	1	..	..	..	4	..	..	..
24	..	1	6	4	6	..	6	27	..	..	..
25	1	13	15	4	11	..	8	83	..	1	..
26	5	16	13	19	19	..	7	133	..	8	..
27	9	27	16	18	8	..	12	161	..	17	..
28	10	27	14	8	10	..	5	138	..	8	..
29	14	16	9	16	14	..	7	124	..	15	..
30	14	17	9	7	10	..	3	98	..	3	..
31	4	1	9	8	2	..	4	59	..	5	1
32	6	..	12	5	5	..	7	57	..	5	..
33	6	2	5	1	4	..	..	36	..	5	2
34	4	3	3	4	1	..	1	28	..	2	2
35	3	1	4	1	1	..	3	18	1	1	1
36	2	2	1	..	1	..	2	12	1	1	3
37	..	..	1	..	1	..	..	5	2	1	..
38	..	..	..	1	1	..	..	5	2	..	3
39	1	..	..	..	1	1	2	5	2	..	1
40	3	..	1	..	..	2	..	7	1	1	2
41	..	..	1	1	..	2	1	6	2	..	1
42	..	..	..	..	..	..	..	1	1	..	1
43	2	..	..	..	..	1	1	5	1	..	3
44	..	..	..	..	..	1	..	1	3	..	2
45	1	..	..	..	..	..	..	2	2	..	1
46	1	..	..	..	..	2	1	5	6	..	1
47	..	..	1	..	..	..	..	2	3	..	..
48	..	..	1	..	..	1	..	3	1	..	2
49	..	..	..	..	..	2	1	4	..	..	..
50	..	..	..	..	..	4	..	4	2	..	5
51	1	..	..	..	..	2	..	5	1	..	..
52	..	..	1	..	..	2	1	4	3	..	1
53	..	..	..	..	..	3	..	3	1	..	2
54	..	..	..	..	..	..	..	..	..	..	1
55	..	..	..	..	..	..	..	..	1	..	1
56	..	..	..	..	..	..	..	..	..	..	..
57	..	..	..	..	..	..	..	..	..	..	..
58	..	..	..	..	..	..	..	..	..	..	..
59	..	..	..	..	..	..	..	..	..	..	..
60	..	..	..	1	..	2	1	4	..	..	1
61	..	..	..	..	..	..	..	..	..	..	..
62	..	..	..	..	..	..	..	..	..	..	..
63	..	..	..	..	..	..	..	..	..	..	..
64	..	..	..	..	..	..	..	..	..	..	..
65	..	..	..	..	..	..	..	..	..	..	..
66	..	..	..	..	..	..	..	..	..	..	..
67	..	..	..	..	..	1	..	1	..	..	..
Total number	87	126	122	99	95	26	73	1050	36	73	37
Average length cm	31.24	28.02	29.37	28.77	28.29	49.15	30.29	29.671	44.67	29.27	43.38

Depth-Area	C_2							D_2			
Square-Area	H_{10}	K_{12}	K_{12}	H_{10}	H_{10}			I_{12}	I_{12}	I_{12}	
Date of capture	8. X. 22	8. X. 22	8. X. 22	18. X. 22	20. X. 22	Oct. 1922	Sept.-Oct. 1922	1. X. 22	2. X. 22	19. X. 22	Oct. 1922
Fishing-place	138 miles W by N of Horns Reef	125 miles NW$^1/_2$N of Slugen	125 miles NW of Slugen	160 miles W by N$^1/_2$N of Graa Deep	122 miles W by N of Horns Reef			144 miles NW of Horns Reef	132 miles NW of Horns Reef	156 miles NW of Graa Deep	
Depth in m	43	58	56	45	47			64	53	47	
Weight of catch in kg	5000	2500	2750	1500	4000			2000	3000	4000	
Weight of sample in kg	35	35	35	35	35			35	35	35	
Length cm						**Total**	**Total**				**Total**
22	..	..	..	..	..	..	..	..	..	..	..
23	..	..	..	..	..	..	4	..	..	..	..
24	..	..	..	..	..	..	27	..	..	..	..
25	..	..	..	..	..	1	84	..	..	..	..
26	..	..	..	..	..	8	141	..	..	..	..
27	..	..	..	..	..	17	178	..	..	..	..
28	..	..	..	..	..	8	146	..	..	..	..
29	..	..	..	..	..	15	139	..	..	..	..
30	..	..	2	..	..	5	103	..	..	..	..
31	..	..	..	..	..	6	65	..	..	..	..
32	..	..	..	..	..	5	62	..	..	..	..
33	..	..	1	..	..	8	44	1	..	..	1
34	..	1	1	..	1	7	35	..	..	..	..
35	..	..	2	..	3	8	26	..	1	1	2
36	..	..	2	..	2	9	21	..	2	..	2
37	..	..	..	1	3	7	12	..	6	..	6
38	..	..	4	1	2	12	17	..	2	3	5
39	..	..	..	..	2	5	10	1	4	1	6
40	1	1	..	2	3	11	18	1	1	3	5
41	..	..	2	1	3	9	15	..	..	3	3
42	..	2	1	2	3	10	11	1	1	..	2
43	2	1	1	2	3	13	18	3	..	2	5
44	1	3	1	3	1	14	15	4	2	2	8
45	1	3	1	6	2	16	18	3	..	3	6
46	1	2	..	2	..	12	17	1	1	2	4
47	1	2	3	4	2	15	17	4	2	1	7
48	3	1	2	2	3	14	17	5	1	3	9
49	1	1	..	1	..	3	7	..	3	1	4
50	1	6	5	2	4	25	29	3	1	1	5
51	1	3	2	..	1	8	13	2	..	1	3
52	2	1	..	2	1	10	14	2	3	1	6
53	2	1	2	1	1	10	13	1	2	1	4
54	..	..	1	..	1	3	3	1	1	1	3
55	1	..	..	1	1	5	5	..	1	..	1
56	1	..	..	..	..	1	1	..	..	..	..
57	..	..	..	..	..	..	..	..	..	..	..
58	..	..	..	..	..	..	..	..	..	1	1
59	1	..	..	..	..	1	1	..	..	..	..
60	3	..	1	..	..	5	9	1	2	2	5
61	..	..	..	..	..	..	..	..	..	..	..
62	..	..	..	..	..	..	..	..	..	..	..
63	1	..	..	..	..	1	1	..	..	..	..
64	..	..	..	..	..	..	..	..	..	..	..
65	..	1	..	..	..	1	1	..	..	..	..
66	..	..	..	..	..	..	..	..	..	..	..
67	..	..	..	..	..	..	1	..	..	..	..
Total number	24	29	34	33	42	308	1358	34	36	33	103
Average length cm	51.04	47.38	43.71	45.61	43.12	41.40	32.331	46.79	44.64	45.76	45.71

Dansk Resumé.

Kirstine Smith: Om Rødspættebestanden i Horns Rev Omraadet i Efteraaret 1922.

I. Indledning. Observationsmateriale.

Savnet af et Undersøgelsesskib har i nogle Aar stillet sig hindrende i Vejen for Fiskeriforsøg i den aabne Nordsø fra dansk Side. Det har kun været muligt at følge Rødspættebestandens skiftende Tæthed og Vækst gennem de Oplysninger, som Fiskeristatistiken og Undersøgelser af Markedsrødspætterne kunde give. Skønt man herved var i Stand til i store Træk at spore Virkningerne af Krigsaarenes indskrænkede Fiskeri, har Savnet af mere direkte Oplysninger været meget føleligt. Paa den ny Undersøgelsesdamper »Dana«s første Togt i de danske Farvande var det derfor en af Hovedopgaverne at udføre Fiskeforsøg med særligt Henblik paa Rødspætten.

Under Togtet i September 1922 foretog Dr. A. C. Johansen 33 Fiskeforsøg paa Stationer i Horns Rev Omraadet (se Fig. 2). Redskabet var en 50 Fods Ottertravl med ekstra Omhyllingsnet om den bageste Ende af Travlen. Forsøgene varede fra en halv til to Timer, og alle Rødspætter i Fangsten blev talt og som Regel maalt. Ved de fleste Stationer blev Alderen bestemt ved Otolith og Kønnet undersøgt for alle Individer undtagen 0-Gruppens. Paa 12 Stationer, hvor Fangsterne var meget store, blev i de talrigst repræsenterede Længdegrupper Alder og Køn kun undersøgt for en Del af Individerne, og Resten blev fordelt proportionalt med de undersøgte. Observationerne meddeles i "Tables of Measurements A".

Ved Siden af disse Fiskeforsøg blev der i Efteraaret 1922 udført Maalinger af Markedsrødspætter landede i Esbjerg. Der blev maalt 23,299 Fisk fordelt paa 247 Prøver, hvoraf 145 stammede fra Fangster foretaget i den Del af det internationale Felt B_4, som ligger nord for Horns Rev, og som i Efteraaret 1922 var meget rigere paa Markedsrødspætter end det endnu tættere befolkede Omraade vest for Graadyb. Maalingerne meddeles i "Table of Measurements B".

Endelig er her behandlet Resultaterne af Mærkningsforsøgene udført i Foraarene 1920 og 1921 syd for Horns Rev.

II. Rødspættebestandens Sammensætning.

A. Rødspætternes Tæthed.

Af "Tables of Measurements A" er beregnet det Antal Rødspætter af hver Aldersgruppe, som fanges pr. Time med en 50 Fods Ottertravl, og Resultaterne er meddelt paa Kortene i Fig. 1. Da Tallene varierer stærkt selv mellem Stationer, som ligger nærved hinanden, giver det et bedre Overblik at betragte Middelværdier for Grupper af Stationer. Vi har derfor grupperet Stationerne efter seks Felter, der ligesom de internationale Areas til Dels begrænses af Dybdekurver.

Inddelingen, som er angivet paa Fig. 2, er følgende:

A_a	syd	for	Horns	Rev,	Dybde:	0—20 m
A_b	nord	»	»	»	»	0—20 »
B_a	syd	»	»	»	»	20—30 »
B_b	syd	»	»	»	»	30—40 »
B_c	nord	»	»	»	»	20—40 »
C					»	over 40 »

Den gennemsnitlige Fangst pr. Time for hver af disse Felter er givet i Table 1, og for Aldersgrupperne 0—IV fremstillet grafisk i Fig. 4.

a. Tæthedens Variation i September 1922.

Kortene i Fig. 1 illustrerer tydelig det velkendte Forhold, at de unge Rødspætter lever i Nærheden af Kysten og efterhaanden, som de bliver ældre, gaar ud paa større Dybder og spredes over større Omraader, idet nogle af de ældre Individer stadig bliver tilbage i Kystomraadet.

0-Gruppen findes i September især i A_a og A_b og er ikke fanget paa dybere Vand end 23 m. Den findes gennemgaaende ikke synderlig hyppigere i A_a end i A_b. Alle de andre Aldersgrupper er omtrent lige talrigt repræsenterede i B_a og i A_a og er i disse Felter adskillige Gange saa talrige som i A_b. Indenfor 20 Meterkurven er den samlede Tæthed af Rødspættebestanden, som den fremgaar af disse Fangster, saaledes tre Gange saa stor syd for Horns Rev som nord for Revet. I- og II-Gruppen hører især hjemme i A_a og B_a, og de har begge, betragtet i Retningen Nord til Syd, en maksimal Tæthed omtrent vest for Graadyb. I-Gruppen forekommer ikke paa større Dybder end 36 m. II-Gruppen findes ved alle Stationer undtagen to af de vestligste. III-, IV- og V-Gruppen er især hyppig forekommende i A_a, B_a, B_b og B_c. Udenfor 20 Meterkurven er Individer af disse Aldersgrupper ikke væsentlig talrigere syd for end nord for Horns Rev, og i Retningen Nord til Syd finder man ikke for disse Aldersgrupper noget Maksimum af Tæthed vest for Graadyb.

Vi har her sammenlignet Tætheden for samme Aldersgruppe i forskellige Dele af Undersøgelsesomraadet; dersom vi i Stedet for efter Alder grupperer Rødspætterne efter Størrelse og f. Eks. undersøger den vekslende Tæthed af Markedsrødspætter, kommer vi til ganske andre Resultater paa Grund af den forskellige Væksthastighed nord og syd for Horns Rev. Markedsrødspætternes Tæthed er behandlet under D.

b. Sammenligning af Tætheden i 1922 med Tætheden i Aarene 1903—1907.

Fra dansk Side har der ikke siden Foraaret 1907 været foretaget Fiskeforsøg med Ottertravl, og Otolithundersøgelser blev først almindelig gennemført fra Sommeren 1905. Fra Fiskeforsøgene foretaget i 1903—1904 og i Foraaret 1905 har vi derfor ikke noget Maal for Tætheden af de enkelte Aldersgrupper, men vi kan for Rødspætter af samme Størrelsesgruppe sammenligne Tætheden med den i 1922 forefundne.

I Fig. 2 og Fig. 3 meddeles Tætheden af Rødspætter af Længden 10—19 cm. Det fremgaar af disse Kort, at Tætheden af saadanne Rødspætter i A_a og B_a i Efteraarene 1903 og 1904 og i Foraarene 1904 og 1905 var ca. 3 Gange saa stor som i Efteraaret 1922. I A_b synes Tætheden i September 1922 mindre end i Efteraarene 1903 og 1904, men større end i Foraarene 1904 og 1905.

Som det vil ses i det næste Afsnit, har Rødspætternes Vækst i Horns Rev Omraadet i 1922 været usædvanlig ringe, saa at Størrelsesgruppen 10—19 cm ikke havde samme Alderssammensætning i 1922 som i Efteraarene 1903—1905. Ifølge Undersøgelser paa to Stationer i den nordlige Del af A_a og B_a omfattede Størrelsesgruppen 10—19 cm i September 1905 I-Gruppen og omtrent to Trediedele af II-Gruppen, medens den i September 1922 i den nordlige Del af A_a og B_a bestod af I-Gruppen og hele II-Gruppen. Da Væksten i 1903 og 1904 ifølge Mærkningsforsøgene var langsommere end i 1905, maa man antage, at mindst to Trediedele af II-Gruppen i de Aar var mindre end 20 cm, og paa den anden Side synes I-Gruppens Vækst, at skifte saa lidt fra Aar til Aar, at man kan antage, at den ogsaa i Efteraarene 1903 og 1904 praktisk talt udelukkende bestod af Individer over 9 cm. Regner man med, at I-Gruppen og II-Gruppen i begge Perioder var lige hyppige i Fangsterne, skulde herefter de ændrede Vækstforhold — under Forudsætning af, at Tætheden for begge Aargange havde holdt sig uforandret — have bevirket, at Tætheden af Individer i Størrelsesklassen 10—19 cm var blevet forøget i Forholdet

$$\frac{1+1}{1+\frac{2}{3}} = \frac{6}{5}$$

fra Perioden 1903—1904 til 1922. I Stedet for en saadan Forøgelse af Tætheden har vi i de nordlige Dele af A_a og B_a fundet en tre Gange saa stor Tæthed, hvoraf vi maa slutte, at baade I- og II-Gruppen har været meget talrigere repræsenterede i 1922 end i 1903—1904.

Fra Fiskeforsøgene i September 1905 har man fundet de i Table 2 anførte Tætheder. En Sammenligning med Table 1 viser, at paa Stationerne i A_a og B_a er den samlede Tæthed omtrent tre Gange saa stor i 1922 som i 1905, og at Tætheden for II-Gruppen maaske er tiltaget endnu stærkere. Men paa den eneste Station fra A_b, som er undersøgt i 1905 er saavel Tætheden af Størrelsesgruppen 10—19 cm som den totale Tæthed større end de tilsvarende gennemsnitlige Værdier for A_b i 1922.

I Foraaret 1907 fandt man, som det vil ses af Table 3 og Fig. 3, en endnu ringere Fangst pr. Time end i Efteraaret 1905. For I-Gruppen og maaske for II-Gruppens Vedkommende er det rimeligvis delvis begrundet ved Fiskenes ringe Størrelse i Majmaaned. I hvert Fald er der ikke for III- og IV-Gruppens Vedkommende en saa enorm Forskel mellem Værdierne for 1907 og for 1922. Tæthederne for disse Grupper er i A_a og A_b omtrent lige saa store i Maj 1907 som i September 1922, men i B_a og B_c meget mindre i 1907 end i 1922. Man vilde imidlertid paa Forhaand vente sig i Maj at finde en Ophobning af Individer af disse Aldersgrupper i A_a og B_a, som vil sprede sig i Løbet af Sommeren, naar Rødspætten vandrer ud paa dybere Grunde. Maaske er det derfor mere formaalstjenligt at betragte den gennemsnitlige Tæthed for alle Felter, og denne er for III- og IV-Gruppen omtrent fire Gange saa stor i September 1922 som i Maj 1907.

De almindelige Indtryk man faar ved Sammenligningen mellem Resultaterne af Fiskeforsøgene i Perioden 1903—1907 med Resultaterne fra September 1922 er følgende:

Individer af hver af Aldersgrupperne I og II er i 1922 i det mindste tre Gange saa talrige vest for Graadyb indenfor 30 Meterkurven som i den tidligere Periode, og det samme er Tilfældet for III-, IV- og V-Grupperne, saavidt Oplysninger haves; men der er intet Vidnesbyrd om, at Tætheden udenfor 30 Meterkurven i 1922 har været større end i den tidligere Periode, og i Kystfarvandet nord for Horns Rev synes Tætheden i Efteraarene 1903—1905 at være i det mindste lige saa stor som i 1922.

Det sikreste og bedst begrundede af disse Resultater er den store Tilvækst af Individer af I- og II-Gruppen i Omraaderne A_a og B_a. Disse Aldersgruppers maksimale Tætheder falder i 1922 i A_a og B_a. Undersøgelserne fra 1903—1905 er ikke saa omfattende, at vi kan være sikre paa, at det ogsaa i disse Aar forholder sig saaledes; men paa den anden Side giver de i A_a, B_a og C undersøgte Stationer heller ingen Antydninger af det modsatte. Tæthedsundersøgelserne leder derfor til den Antagelse, at ogsaa Tætheden af de totale I- og II-Grupper syd for Horns Rev i 1922 var mindst to til tre Gange saa stor som i Perioden 1903—1905.

En Sammenligning mellem Table 4 og Fig. 1 viser, at Individer af 0-Gruppen i A_a er adskillige Gange saa talrige i 1922 som i 1903—1905. Ved Fiskeforsøgene med Yngeltravl ved Jyllands Vestkyst har man ikke fundet, at 0-Gruppens Tæthed i 1920 og 1921 var usædvanlig stor i Sammenligning med Tætheden i Aarene forud for Krigen. Men disse Forsøg er ikke saa omfattende, at vi derfor tør udelukke den Mulighed, at Rødspætteynglen i Nordsøen i det store og hele har været rigere i 1920 og 1921 end sædvanlig.

Den store Rigdom paa Individer af I- og II-Gruppen syd for Horns Rev i September 1922 begunstiger den Antagelse, at Rødspætteynglen i 1920 og 1921 har været usædvanlig talrig, og de Forandringer, som ellers er iagttaget i Nordsøens Rødspættebestand, støtter denne Formodning. Markedsrødspætternes[1] Antal naaede sandsynligvis et Maksimum i 1919 som Følge af Krigstidens Fredning. Da Markedsrødspætternes Gennemsnitsalder af samme Grund var vokset under Krigen viste de ynglende Rødspætters Antal rimeligvis et forholdsvis endnu mere udpræget Maksimum, og det er sandsynligt, at deres Antal endnu i 1920 og 1921 var betydelig større end i det sidste Decennium forud for Krigen.

B. Alder og Længde.

a. Gennemsnitslængder for de forskellige Aldersgrupper i September 1922.

De i "Tables of Measurements A" meddelte Gennemsnitslængder for Aldersgrupper er fremstillede paa Kortene i Fig. 5. Disse viser, at Gennemsnitslængden for hver Aldersgruppe vokser i Retning fra Kysten

[1] Ved Markedsrødspætter forstaas her Rødspætter over 25 cm Totallængde.

udefter. Rødspætterne er ikke alene naturligt sorterede efter Alder, men ogsaa de enkelte Aldersgrupper er delvis sorterede efter Længde. Dette iagttages allerede klart for 0-Gruppen og endnu tydeligere for de følgende Aldersgrupper. Men ved Siden af denne Gradation i Retning fra Kysten udad, bemærkes der karakteristiske Forskelle mellem Gennemsnitslængden syd og nord for Horns Rev.

Gennemsnitslængden af 0-Gruppen (se Table 5) er allerede noget større nord for Horns Rev i A_b end syd for Horns Rev i A_a. For de følgende Aldersgrupper er der en endnu større Forskel mellem Gennemsnitslængderne i A_b og A_a, saa at II-, III- og IV-Gruppen i A_b har omtrent de samme Gennemsnitslængder som henholdsvis III-, IV- og V-Gruppen i A_a. Gennemsnitslængden er imidlertid ikke meget større i B_a end i A_a, især ikke for I- og II-Gruppen. Dette saavelsom Tæthedsfordelingen tyder paa, at der er en livlig Udveksling af Rødspætter mellem A_a og B_a, og at Horns Rev danner en Grænse mellem A_a og A_b, saa at hvert af disse Omraader har en særpræget Bestand. For baade I- og II-Gruppen bemærker man i Retningen Nord—Syd et Minimum for Gennemsnitslængden i A_a og B_a vest for Graadyb paa samme Sted, hvor disse Aldersgrupper viste et Maksimum af Tæthed. For III- og IV-Gruppen findes ikke et saadant tydeligt Minimum, men Gennemsnitslængden aftager i det store og hele i Retning fra Nord til Syd.

Forskellen mellem Længden af Rødspætter af samme Alder nord og syd for Horns Rev illustreres yderligere i Table 6. Denne giver for hver Aldersgruppe Længdefordelingen pr. 100 Individer og den gennemsnitlige Længde i de to Omraader ($A_a + B_a + B_b + C$) og ($A_b + B_c$). Under Forudsætning af, at Gennemsnitslængderne for hver Aldersgruppe er de samme i 1921 som i 1922, finder man af Table 6 den i Table 7 angivne aarlige Vækst. Denne Tabel viser, at Væksten i det andet og i det tredje Leveaar er omtrent 2 cm større nord for Horns Rev end syd for Revet. Det synes rimeligt, at dette skyldes en bedre Ernæring i det nordlige Omraade end i det sydlige, hvor vi specielt for I- og II-Gruppen fandt, at Tætheden var overordentlig stor. Tætheden af disse Aldersgrupper i A_a og B_a er 6—7 Gange saa stor som i A_b og 9—10 Gange saa stor som den samlede Tæthed af ældre Rødspætter i A_a og B_a, hvoraf følger, at disse Aldersgruppers Tæthed har en væsentlig Indflydelse paa Mængden af Næringsstof pr. Individ. Paa samme Sted som I- og II-Gruppens maksimale Tæthed fandt vi for konstant Afstand fra Kysten en minimal Gennemsnitslængde for baade I- og II-Gruppen, men ikke for III- og IV-Gruppen. Dette sidste er ikke forbavsende, da disse Aargange allerede har spredt sig over et større Omraade og maa antages at have foretaget saa vide Vandringer, at deres Ernæringstilstand i meget ringere Grad er bestemt ved Betingelserne paa det Sted, hvor de fanges, skønt der ogsaa for disse Aargange er en tydelig Gradation i Længden fra Kysten udad og fra Syd til Nord. I Overensstemmelse med denne Betragtning viser Table 7 for det 4de og 5te Leveaar ingen væsentlig Vækstforskel mellem det sydlige og det nordlige Omraade; udenfor 20 Meterkurven er der antagelig en friere Udveksling af Individer mellem de to Omraader end i A_3, og i B_b (udenfor 30 Meterkurven i det sydlige Omraade) er Tætheden ikke større og muligvis Ernæringstilstanden ikke ringere end nordpaa i B_c.

b. Sammenligning mellem Gennemsnitslængderne for Aldersgrupper i 1922 og i 1905—1907.

De eneste, usorterede, otolithundersøgte Prøver fra tidligere Aar er de, i det foregaaende omtalte, fra September 1905 og April—Maj 1907. I Table 8 er Stationerne fra September 1905 sammenlignet med de nærmestliggende Stationer fra September 1922. Det ses, at der ingen væsentlig Forskel er mellem I-Gruppernes Gennemsnitslængde, men II-, III- og IV-Gruppernes Gennemsnitslængde er, som Table 8a viser, i A_a og B_a 4—7 cm længere i 1905 end i 1922. En Betragtning af Kortene i Fig. 5 viser, at saa store Gennemsnitslængder for IV-Gruppen, som de i 1905 observerede, overhovedet ikke forekommer i 1922, og at de store Gennemsnitsværdier for II- og III-Gruppen, som i 1905 observeredes i A_a og B_a, i September 1922 først forekommer i de yderste Dele af B_b. Det er saaledes klart, at selv om de yngre Aldersgrupper skulde være stærkere koncentreret til Nærheden af Kysten i 1922 end i 1905, hvad man kunde tænke sig hændte samtidig med, at Gennemsnitslængden paa hvert Sted var aftaget, vilde dette ikke berøre Sammenligningen

synderlig. Vi skal derfor i det følgende betragte de Forskelle, som er anført i Table 8a, som en Tilnærmelse til Forskellen mellem Gennemsnitslængden mellem de totale Aldersgrupper syd for Horns Rev.

Tidligere Undersøgelser i Horns Rev Omraadet har vist, at Væksten i de to første Leveaar ikke veksler meget fra Aar til Aar; af den Omstændighed, at Middellængden for I-Gruppen er den samme i 1905 og 1922, kan man derfor ikke slutte, at Væksten for de andre Aarsgrupper har været lige stærk i 1905 og 1922. Man maa tværtimod antage, at den betydelige Forskel mellem II-Gruppens Gennemsnitslængde i de to Perioder kan betragtes som et Maal for Vækstforskellen i $(A_a + B_a)$ i de to Somre, skønt den endnu større Forskel for III- og IV-Gruppen lader formode, at Væksten i Sommeren 1904 ogsaa har været stærkere end i 1921. Da Gennemsnitslængderne fra Stationerne i C er meget mindre afvigende, tør man maaske antage, at Væksten derude har været omtrent den samme i 1904—1905 og i 1920—1921, og at det er under Opholdet i Kystomraadet, at de i C fangede Rødspætter har været underkastede forskellige Livsbetingelser, som har bevirket en noget forskellig Vækst.

I Table 9 er Stationerne i A_a og A_b fra Foraaret 1907 sammenlignet med de nærmestliggende Stationer fra September 1922, paa den Maade, at en Aldersgruppe fra Foraaret 1907 sammenstilles med den nærmest yngre Aldersgruppe fra Efteraaret 1922. Forskellen mellem Gennemsnitslængderne fremgaar af Table 9a; da Væksten fra September til Maj det følgende Aar i 1906—1907 ifølge Mærkningsforsøgene maa anslaas til ca. 2 cm, bliver der, ogsaa naar man trækker dette Beløb fra, en betydelig Forskel tilbage for de tre ældste Aldersgrupper, som dog maaske ikke alene skyldes forskellig Vækst. Om Foraaret er der nemlig utvivlsomt i A_a og A_b en Ophobning af større Rødspætter, hvoraf i det mindste en Del i Slutningen af den foregaaende Sommer har levet paa dybere Vand, hvoraf følger, at de paa den Tid var større end Rødspætter af deres Aarsgruppe, som levede i A_a og A_b. Det har maaske derfor større Interesse at sammenligne Middelværdierne fra A_a og A_b for Foraaret 1907 med Middelværdierne for de totale Aldersgrupper fra Table 6. Herved findes de i Table 9b angivne Differenser, som viser, at naar man regner med en Vækst af 2 cm fra September 1906 til Maj 1907, bliver der endnu en betydelig Vækstforskel tilbage mellem Aarene 1906 og 1922.

Med Benyttelse af de Oplysninger, som Mærkningsforsøgene fra 1905 og 1906 giver om Væksten, og de Oplysninger, som Tables 8a og 9b giver om Længdeforskellene for Aldersgrupper, ledes vi til det Skøn, at Væksten i Horns Rev Omraadet i 1922 for unge Rødspætter over to Aar gamle kun har været lidt over 3 cm. Om Væksten i 1921 maa vi antage, at den har været en Del ringere end i Aarene 1904 og 1905, da den ifølge Mærkningsforsøgene var henholdsvis 5.5 og 8 cm. For 1920 er Væksten ved Hjælp af Mærkningsforsøg (se Fig. 14) bestemt til ca. 7 cm. Det er derfor sandsynligt, at de usædvanlig smaa Gennemsnitslængder, som i September 1922 er observeret i Horns Rev Omraadet, alene skyldes en usædvanlig langsom Vækst i Somrene 1921 og 1922.

En lignende Aftagen i Vækst er fra engelsk Side iagttaget paa Linien Leman-Haaks for 1920 og de foregaaende Aar ved at sammenligne Gennemsnitslængder for Aldersgrupper iagttaget i 1920 og i 1905—1906.

C. Køn.

a. Talmæssig Fordeling af de to Køn i September 1922.

Table 10 giver for Aldersgrupperne I til IV Procenttallet af Hunner i hvert Felt. Beregningen er foretaget paa Grundlag at "Tables of Measurements A" ved at addere Antallet af Individer fanget pr. Time ved hver af Stationerne og bestemme Procenttallet af Hunner i Summen. Beregningen af Middelfejlene i Table 10 er baseret paa den teoretiske Middelfejl for en Bestemmelse af Kønnet i et enkelt Individ, og ved den videre Beregning er det nøje taget i Betragtning, om Kønnet virkelig er blevet undersøgt i hvert Individ, eller om Kønsbestemmelsen er et Resultat af Beregning.

Ser vi paa det sydlige Omraade omfattende A_a, B_a, B_b og C, viser Tabellen, at der er en tydelig Aftagen i Procenttallet af Hunner fra A_a gennem B_a og B_b til C. For Aarsgrupperne II til IV er der en

stadig Aftagen i Procenttallet fra Kysten udefter; for I-Gruppen er Procenttallet større i B_a end i A_a, men Forskellen er kun 4.2 ± 4.4. I det nordlige Omraade bestaaende af A_b og B_c, som er mindre tæt befolket, og hvorfra vi derfor har færre Observationer, kan man kun for I-Gruppen fastslaa en afgjort Aftagen af Procenttallet af Hunner fra A_b til B_c, men kun for III-Gruppen gaar Forskellen i modsat Retning, og den beløber sig kun til en Trediedel af dens Middelfejl. Der er derfor ingen Tvivl om, at for hver af Aldersgrupperne I—IV aftager den relative Hyppighed af Hunner i det store og hele fra Kystomraadet udad. I mange Tilfælde er Middelfejlen af Procenttallet af Hunner ved de enkelte Stationer saa store, at denne relative Aftagen i Hunnernes Antal tilsløres, men Kortet Fig. 6 over Procenttallet af Hunner i II-Gruppen illustrerer dog Forholdet ganske godt.

En relativ Aftagen i Antallet af Hunner fra A_3 til B_4 er paavist ved de engelske Undersøgelser i 1906, men ved disse fandt man igen en Tiltagen i den relative Hyppighed af Hunner fra B_4 til C_2. Vore Undersøgelser i September 1922 omfatter imidlertid en saa ringe Del af C_2, at de ikke engang vilde kunne oplyse, om der øst for Dogger Banke var en Tiltagen.

Naar man i Table 10 sammenligner Procenttallene for de forskellige Aldersgrupper i eet og samme Felt, bemærker man en Tiltagen af den relative Hyppighed af Hunner med voksende Alder. Kun tre Værdier i Tabellen (A_a, IV; A_b, III og B_a, I) bryder denne Regel, og de afviger højst fra deres Naboværdier med 0.6 Gange Middelfejlen paa Afvigelsen. Ogsaa naar man betragter hele Omraadet under eet, er den relative Hyppighed af Hunner lidt større i III- og IV-Grupperne end i I- og II-Grupperne, men kun for I- og III-Gruppen nærmer Forskellen sig til to Gange dens Middelfejl. Da Stationerne ligger tættest i A_a og B_a, hvor Hunnerne af III- og IV-Grupperne er hyppigere end længere vestpaa, og da det maa antages, at et Overskud af Hanner af III- og IV-Grupperne er vandret ud af Undersøgelsesomraadet vestpaa, er det dog ikke raadeligt at betragte Tallene i Table 10 som et Vidnesbyrd om, at Hunnerne af de samlede Aldersgrupper er tiltagende i relativ Hyppighed med tiltagende Alder.

Den simpleste Forklaring paa den fundne talmæssige Fordeling af Hanner og Hunner synes at være den, at Hannerne af enhver Aldersgruppe vandrer længere ud fra Kysten end Hunnerne. Dette forklarer for det første, at der i hver Aldersgruppe er et aftagende Procenttal Hunner, naar man bevæger sig fra Kysten ud paa dybere Vand, og for det andet, at paa ethvert Sted er Procenttallet af Hunner af den ældste Aldersgruppe større end for den næstældste og stadig videre aftagende med aftagende Alder. At Hannerne skulde vandre længere ud end Hunnerne er at vente i de Aldersgrupper, som indeholder modne Individer. Men alle de her undersøgte Rødspætter syntes umodne, og selv om det kunde tænkes, at Gradationen i Procenttallet af Hunner for III- og IV-Gruppens Vedkommende var opstaaet alene ved, at en Del modne Hanner var udvandret vestpaa helt ud af Undersøgelsesomraadet, vilde denne Forklaring ikke kunne anvendes for II-Gruppen, hvoraf utvivlsomt intet Individ har naaet Modenheden, og som næppe forekommer paa dybere Vand end det her undersøgte. Vi maa altsaa antage, at, selv inden Modenheden er naaet, har Hanner af de unge Aldersgrupper en større Tilbøjelighed til at forlade Kystomraadet end Hunner af samme Alder.

Man ser af Kortene for II- og III-Gruppen i Fig. 5, at paa samme Station er Gennemsnitslængden i Reglen noget større for Hunner end for Hanner af samme Alder. Det samme Indtryk faar man ogsaa af Table 5, naar man sammenligner Gennemsnitslængderne af Hanner og Hunner for samme Felt. Det er imidlertid tvivlsomt, om dette hos disse unge Aldersgrupper skal opfattes som et Vidnesbyrd om hurtigere Vækst hos Hunner end hos Hanner. Naar de største Individer af en Aldersgruppe vandrer først ud, og naar Hannerne vandrer tidligere ud end Hunnerne, maa Resultatet — under Forudsætning af lige Vækst for de to Køn — blive, at paa hvert givet Sted er Gennemsnitslængden større for Hunner end for Hanner. Sammenligner man for hvert af de to Omraader ($A_a + B_a + B_b + C$) og ($A_b + B_c$) Gennemsnitslængderne for Hanner og for Hunner af samme Aldersgrupper, finder man da heller ikke, at Hunnerne er Hannerne overlegne i Størrelse. (Se Table 11.)

b. Talmæssig Fordeling af de to Køn iagttaget ved de danske Undersøgelser i Aarene 1903, 1905 og 1907.

Det synes at fremgaa af Tables 12 og 13, som giver Resultaterne af de danske Undersøgelser fra 1903, 1905 og 1907, at Hunnernes relative Hyppighed i Horns Rev Omraadet er større i September end om Foraaret. Paa begge Aarstider iagttager man ligesom i September 1922 en større relativ Hyppighed af Hunner i A_a end i B_a.

c. Har de to Køns relative Hyppighed ændret sig?

En Sammenligning af Table 10 med Tables 12 og 13 viser, at den relative Hyppighed af Hunner er væsentlig mindre i September 1922 end i September 1903 og 1905. Medens Hunnerne blandt Rødspætter over et Aar i September 1903 og 1905 var i afgjort Flertal, er de i September 1922 kun i nogenlunde sikkert Flertal i A_a og i afgjort Mindretal i B_c og C. De betragtede Rødspætter tilhører væsentlig Aldersgrupperne I—IV.

Tyske Undersøgelser af Markedsrødspætter fra den sydøstlige Nordsø tyder ogsaa paa, at Hunnernes relative Hyppighed er aftaget efter Krigen. Forskellen fra 1909 til 1919 er, som det ses af Table 14, meget paafaldende. Nedgangen er især fremtrædende for Aarets første Halvdel, da Fangsterne indeholder relativt mange store Rødspætter (over 40 cm lange), hvoraf man tør slutte, at det ikke mindst er i de ældre Aldersgrupper, at Hyppighedsforskydningen er sket.

Ogsaa de engelske Undersøgelser fra 1920 og 1921 i den sydlige Nordsø bringer Vidnesbyrd om en formindsket relativ Hyppighed af Hunner, særlig blandt V-Gruppen og ældre Aldersgrupper.

Vi har saaledes fra tre Grupper af Undersøgelser fundet Vidnesbyrd om et forøget Procenttal af Hanner efter Krigen. For Horns Rev Omraadet synes Forskellen i September 1922 allerede at spores i II-Gruppen, men i det engelske og det tyske Materiale synes Forskellen mest paafaldende for de ældre Aarsgrupper.

Man kan vanskelig tænke sig en enkelt Forklaring, som kan finde Anvendelse baade for de unge Aargange i Horns Rev Omraadet og for de ældre over fem Aar gamle. Før Krigen var der aabenbart i Nordsøens samlede Rødspættebestand en tydelig procentisk Aftagen af Hanner fra den Alder, ved hvilken Flertallet af Hanner blev modne, til ældre Aldersgrupper; men om denne større Dødelighed af Hanner end af Hunner skyldtes Fiskeriet eller »naturlige« Aarsager, er ikke opklaret. Man har tænkt sig den Mulighed, at det skyldtes det Forhold, at de modne Hanner paa Ynglepladserne, hvor de opholder sig længere Tid end Hunnerne, var Genstand for stærkere Fiskeri end Hunner af samme Alder. Hvis det forholdt sig saaledes, maatte Fiskeriets Indskrænkning under Krigen, især da det ikke mindst blev hæmmet paa Ynglepladserne, virke til at udligne Hyppighedsforskellen mellem modne Hanner og Hunner. Men herved forklares ikke, hvorfor Hannerne allerede inden Femaarsalderen skulde være relativt hyppigere efter Krigen end før, og det er, hvad de danske Undersøgelser i Horns Rev Omraadet synes at vise. Det blev under »a« paavist, at den relative Hyppighed af Hunner i en Aldersgruppe aftog i Retning fra Kysten udad, og dette forklaredes ved at antage, at Hannerne vandrede tidligere ud end Hunnerne. Da Rødspætter af en vis Alder nu er mindre end tidligere, og da Modenheden efter al Sandsynlighed naas senere[1], er det sandsynligt, at den delvise Udskillelse af Hanner fra Hunner ogsaa sker i en højere Alder end tidligere. Hvis det forholder sig saaledes, kan den relative Aftagen af Hunner i Horns Rev Omraadet fra September 1903 og 1905 til September 1922 naturligt forklares ved en forskellig stedlig Fordeling af Hanner og Hunner i de to Perioder, og der er ingen Grund til at antage, at den relative Hyppighed af de to Køn har ændret sig for de totale Aarsgrupper.

[1] Skønt man ikke altid med Sikkerhed kan afgøre, allerede i September, om et Individ opnaar Modenhed i den forestaaende Yngleperiode eller ej, tyder Undersøgelserne i September 1922, i hvilke alle undersøgte Individer blev skønnet umodne, ubetinget paa, at Modenheden nu indtræder ved en højere Alder end i 1910.

D. Undersøgelser af Markedsrødspætter ilandbragte i Esbjerg.

I Tiden fra 23de September til 10de November 1922 blev der maalt 247 Prøver af Markedsrødspætter, landede i Esbjerg, og Maalingerne er meddelt i "Table of Measurements B". Over Halvdelen af Prøverne stammer fra Fangster, som er gjort i Feltet B_4, og tilmed fra den Del af B_4, som ligger nord for Horns Rev, og som vi har benævnt B_c. Disse Prøver bestaar gennemsnitlig af 110 Individer hver, medens Prøver fra C_2, B_1 og D_2, hvor Rødspætterne er større, kun bestaar af 30—40 Individer. Ialt er der maalt 23299 Rødspætter. For Salg i Danmark er Mindstemaalet 25.7, for Eksport er det om Sommeren indtil Oktober 22.5 cm og derefter 24.0 cm.

a. Længdernes Hyppighedsfordeling i Felterne B_4 og B_5.

En Sammenligning af Længdefordelingen pr. 1000 Rødspætter fra B_4 fanget i Efteraaret 1922 (Table 15) med Maalinger fra Efteraarene 1905[1] og 1919[2] viser klart, at Prøverne fra 1922 indeholder forholdsvis mange flere smaa Rødspætter end de andre Prøver. Af Table 16 ses det, at den relative Hyppighed af Rødspætter under 27 cm's Længde er henimod dobbelt saa stor i 1922 som i 1919, og mere end dobbelt saa stor som i 1904—1905, skønt Fiskeriet i 1922 væsentlig foregik paa dybere Vand og udelukkende nord for Horns Rev. For at udelukke Virkningen af en mulig forskellig Sortering har vi desuden sammenlignet Rødspætter over 27 cm særskilt. Table 17 giver for B_4 og B_5 Fordelingen af 1000 Rødspætter over 27 cm blandt tre Størrelsesgrupper.

Man vil se af denne Tabel, at Prøverne fra B_4 og B_5 taget i 1922 viser omtrent samme Hyppighedsfordeling, og at denne ikke afviger væsentlig fra Hyppighedsfordelingen for B_5 i 1904—1905. Derimod indeholder Prøverne fra B_4 taget i 1904—1905 og 1919 et betydeligt større Procenttal Rødspætter over 30 cm end de øvrige Prøver.

Det er tidligere paavist, at der i September 1905 ilandbragtes ganske usædvanlige Fangster fra Omraadet B_4, som i Sammenligning med de øvrige Fangster paa den Tid og fra det Omraade bestod af ualmindelig store Rødspætter. Blandt de 24 Prøver benyttede i Table 17 stammer 8 fra saadanne Fangster. De øvrige 16 Prøver giver følgende Procenttal:

Under 30 cm	69.4 %
mellem 30 og 33 cm	22.1 %
over 33 cm	8.5 %

som hvert ligger imellem de tilsvarende Værdier for 1919 og 1922.

Vi kommer saaledes til følgende Resultater: Maalingerne af Markedsrødspætter fra B_4 viser, at Procenttallet af Rødspætter over 30 cm i Bestanden af Rødspætter over 27 cm maa være betydelig mindre i Oktober 1922 end i August og September 1919 og tillige mindre end i Sept.—Nov. af Aarene 1904—1905. Maalingerne fra B_5 viser ogsaa et større Procenttal af Rødspætter mindre end 27 cm i 1922 end i 1904—1905, men dette kan skyldes forskellig Sortering; man finder nemlig for Rødspætter over 27 cm væsentlig den samme Størrelsesfordeling i de to Maaleperioder.

b. Længdernes Hyppighedsfordeling i Omraaderne C_2, B_1 og D_2.

Prøverne fra Omraaderne B_1 og D_2 er slet ikke og Prøverne fra C_2 næsten ikke paavirkede af Sortering, saa at de direkte kan sammenlignes med Prøver fra tidligere Aar.

Et Gennemsyn af de enkelte Prøver fra C_2 i "Table of Measurements B" viser, at Gennemsnitslængderne i 1922 er meget forskellige, eftersom Fangsterne hidrører fra L_9, K_9 og K_{10}, d. v. s. fra Omraadet øst for Dogger Banken, som vi skal benævne $C_{2\,e}$, eller de hidrører fra G_{10}, H_{10}, K_{11} og K_{12}, d. v. s. Om-

[1] Se A. C. Johansen 1910, p. 41.

[2] Se K. Smith 1921, p. 20.

raadet nordvest og nord for den nordøstlige Spids af Banken, som vi benævner $C_{2\ n.\ w.}$ I det sidstnævnte Omraade er Rødspætterne gennemsnitlig meget større end i det førstnævnte og tillige større end i den mellemliggende Del af Dogger Banken. (Se Table 18 og 19). Tidligere danske Maalinger fra C_2 foretaget i 1916 og 1919 omfatter kun Prøver fra $C_{2\ e}$, hvorfor vi i Table 18 behandler Prøverne fra de to Omraader hver for sig. Tabellen viser, at den store relative Hyppighed af Rødspætter over 35—40 cm, som forefandtes i 1919 — sammenlignet med 1916 — er ganske forsvundet fra $C_{2\ e}$ i 1922, da de mindre Rødspætter derimod er relativt hyppigere end i 1916.

Af Table 19, hvor Gennemsnitslængden er beregnet af de enkelte Prøvers Gennemsnitslængder ved at give hver af dem samme Vægt, og hvor den empiriske Middelafvigelse er angivet, ser man, at Afvigelserne mellem Gennemsnitslængderne i 1922 og i 1916 og 1919 er flere Gange saa store som Afvigelsernes Middelfejl. Derimod er Gennemsnitslængden for B_1 og $C_{2,\ n.\ w.}$ i 1922 væsentlig større, end den var for $C_{2,\ e}$ i 1919. Det kan derfor tænkes, at den iagttagne Formindskelse af Gennemsnitslængden af Rødspætter i $C_{2,\ e}$ til Dels skyldes en forskellig regional Fordeling af Rødspætterne i 1922 og i Aarene 1919 og 1916.

c. Længdernes Hyppighedsfordeling i Feltet A_3.

Prøverne fra A_3 indeholder 783 ‰ Rødspætter under 27 cm, medens Prøver fra Efteraarene 1904—1905 og 1919 kun indeholdt omtrent halvt saa mange per mille. Naar man, for at borteliminere Mindstemaalets Indflydelse alene sammenligner Rødspætter over 27 cm, finder man, at ogsaa blandt disse er de mindste Længdegrupper afgjort relativt hyppigere repræsenterede i 1922 end i 1919. Mellem 1922 og 1904—1905 er der ogsaa en dog mindre fremtrædende Forskel i samme Retning. Baade i 1919 og i 1904—1905 udgør den Del af Rødspætterne over 27 cm, som er større end 30 cm, en meget større Procentdel end i 1922.

Baade for B_4 og A_3 har vi altsaa ved at sammenligne Rødspætter over 27 cm, hvis Hyppighedsfordeling kan anses for uafhængig af de vekslende Mindstemaal, fundet, at Størrelsesgruppen over 30 cm i 1922 udgør en meget mindre Procentdel end i 1919 og en noget mindre Procentdel end i 1904—1905. Naar det forholder sig saaledes, er det sandsynligt, at den store relative Hyppighed af Rødspætter under 27 cm, som er iagttaget i 1922, ikke alene skyldes ét mindre Mindstemaal, men maa opfattes som et Tegn paa en større relativ Hyppighed af denne Størrelsesgruppe i de usorterede Fangster.

d. Markedsrødspætternes Alder i Feltet B_c i Efteraaret 1922.

Ved Hjælp af Fiskeforsøgene i September 1922 har vi gjort et Forsøg paa at opstille Alders- og Længdefordelingen for Markedsrødspætter fra B_c i Efteraaret 1922. Idet vi tog vort Udgangspunkt fra Summen af Rødspætter fangede pr. Time ved hver af Stationerne i B_c, antog vi, at Rødspætter over 27 cm ikke berøres af Sorteringen, og at Hyppighederne for Størrelsesgrupper under 27 cm ved Sorteringen reduceres saaledes, at hver Længdegruppe kommer til at udgøre den samme Procentdel af samtlige Rødspætter over 27 cm som blandt Markedsrødspætterne fra B_4 (Table 15). Ved denne Beregningsmaade er vi naaet til Table 21. Det ses af denne Tabel, at 53 % af Markedsrødspætterne hører til III-Gruppen, 22 % til II-Gruppen, 21 % til IV-Gruppen og de øvrige 4 % til V-Gruppen, Naar Markedsrødspætterne er saa unge, er det klart, at deres Gennemsnitslængde og overhovedet deres Længdefordeling i høj Grad afhænger af Væksthastigheden i de to sidste Vækstperioder.

Fra Foraaret 1922 foreligger der en Prøve af Markedsrødspætter (Table 22) fra den dybere Del af Feltet B_a, som er otolithundersøgt. Omtrent Halvdelen af disse Rødspætter er fire Aar gamle, omtrent en Femtedel tre Aar gamle og ligesaa mange fem Aar gamle. De har gennemsnitlig oplevet 4.2 Vækstperioder og er saaledes af omtrent samme Gennemsnitsalder som Markedsrødspætter fra B_a og B_b i Efteraaret 1922, der ifølge Table 23 den 1ste April henholdsvis havde Gennemsnitsalderen 3.8 og 3.6.

Naar man sammenligner Prøven fra Marts 1922 med Prøver af Markedsrødspætter fra A_a taget i Foraarene 1919 og 1920, finder man, at den er gennemsnitlig 1.1 Aar yngre end disse. I September 1922

er Markedsrødspætter fra B_a ifølge Table 23 kun 0.5 Aar yngre end Markedsrødspætter fra A_a, saa at vi har Grund til at antage, at Gennemsnitsalderen af Markedsrødspætterne i Horns Rev Omraadet er aftaget, efter at Fiskeriet har været drevet i mere normalt Omfang i Aarene efter Krigen.

Vi finder altsaa to Aarsager til, at Markedsrødspætterne fra B_4 i 1922 er blevet mindre, end de var i 1919. For det første er den relative Hyppighed af de ældre Aldersgrupper aftaget blandt Markedsrødspætterne som Følge af, at Fiskeriet i Aarene efter Krigen igen er drevet med mere normal Intensitet. For det andet har Væksten i 1922 og sandsynligvis i 1921 været ualmindelig langsom, saa at Gennemsnitslængden af Markedsrødspætter fra hver Aldersgruppe i 1922 antagelig er mindre end i 1919. Den ringe Vækst forklarer tillige, at Markedsrødspætterne i 1922 var endnu mindre end i 1904—1905.

e. Markedsrødspætternes Tæthed i Efteraaret 1922.

For at danne os en Forestilling om Tætheden af Markedsrødspætterne i de forskellige Felter, med hvilke vi ved Bearbejdelsen af Fiskeforsøgene har arbejdet, har vi sammenlignet Antallet af Rødspætter længere end 24 cm indfangede ved disse Forsøg (se Table 23). Fra 1ste Oktober er det tilladt at ilandbringe Rødspætter over 22.5 cm; men som det ses af Table 15, findes der dog kun faa af Længderne 22 og 23 i Prøverne. Heller ikke Rødspætter paa 24 cm er fuldt repræsenterede iblandt de ilandbragte Rødspætter, men ved ganske at udelukke Rødspætter under 24 cm og ved at medregne alle Individer paa 24 cm fra Fiskeforsøgene, faar vi antagelig en rimelig Repræsentation for Markedsrødspætterne i Henseende til Alder og Tæthed. Vi finder saaledes den i Table 23 fremstillede Tætheds- og Aldersfordeling. Fordelingen mellem Aldersgrupper stemmer for B_c's Vedkommende godt med den i Table 21 meddelte, som naaedes ad en mere omstændelig Vej.

Table 23 viser, at Markedsrødspætternes Tæthed i September var usædvanlig stor i B_c (d. v. s. den Del af B_4, som ligger nord for Horns Rev). Tætheden var her 3—4 Gange saa stor som i B_b og omtrent 10 Gange saa stor som i B_a og i C.

Fordelingen af de maalte Prøver af Markedsrødspætter mellem Felterne (se Table 15), som giver et tilnærmet Billede af den totale danske Fangsts Fordeling mellem Felterne, viser, at denne relativt rige Mængde af Markedsrødspætter i B_c ogsaa forefandtes i Oktobermaaned.

En Sammenligning mellem Table 23 og Table 1 godtgør, at den større Hyppighed af Markedsrødspætter i B_c skyldes den hurtigere Vækst. Sammenligner man i Table 1 en Aldersgruppes Tæthed i de forskellige Felter, ser man, at den maksimale Tæthed ikke for nogen af Aldersgrupperne falder i Feltet B_c. Men Forholdet mellem Antallet af Markedsrødspætter af hver af Aldersgrupperne II—IV og det samlede Antal Rødspætter af en Aldersgruppe er meget større for B_c end for B_a og B_b og overgaas kun af de tilsvarende Forhold for C. III-Gruppen, som i Felterne B_a, B_b og B_c danner Grundstammen af Markedsrødspætterne, er omtrent lige saa tæt repræsenteret i B_a og B_b som i B_c, men alligevel er Tætheden af Markedsrødspætter af III-Gruppen i B_a kun ca. $^1/_{11}$ og i B_b kun ca. $^1/_4$ af Tætheden i B_c. II-Gruppen, som i B_c bidrager væsentlig til Bestanden af Markedsrødpætter, er i A_a og B_a ganske uden Betydning for Fiskeriet, skønt dens Tæthed her er tre Gange saa stor som i B_c.

E. Sammenfattende Bemærkninger.

Paa Grundlag af Fiskeforsøgene i Horns Rev Omraadet, som blev foretaget paa »Dana«s Togt i September 1922, har vi kunnet danne os et Billede af Rødspættebestandens Sammensætning i Henseende til Alder og Køn, og af Tætheden og Gennemsnitslængden for de enkelte Aldersgrupper. Vi har fundet følgende karakteristiske Træk. I- og II-Grupperne optræder med usædvanlig Tæthed syd for Horns Rev indenfor 30-Meterkurven, især vest for Graadyb. Paa samme Sted er Gennemsnitslængden for hver af disse Aldersgrupper betydelig mindre end nord og syd derfor. Tætheden er for hver Aldersgruppe mindre i den nordlige Del af A_3 end i den Del af Feltet, som ligger syd for Horns Rev. Udenfor 20-Meterkurven er Tætheden

for Aldersgrupper ældre end tre Aar omtrent den samme nord og syd for Horns Rev, men den gennemsnitlige Længde for hver Aldersgruppe er betydelig større i det nordlige end i det sydlige Omraade. Væksten er i Virkeligheden saa forskellig, at naar man betragter Tætheden af Markedsrødspætter, finder man, at denne er omtrent fem Gange saa stor nord for Horns Rev i B_c som syd for Revet i B_a og B_b, skønt den maksimale Tæthed for hver enkelt Aldersgruppe bestandig findes syd for Revet. I hele Undersøgelsesomraadet med Undtagelse af det Omraade, som ligger indenfor 20-Meterkurven og syd for Horns Rev, er III-Gruppen den fremherskende i Antal blandt Markedsrødspætterne, men ved Siden af den udgør IV-Gruppen en ganske anselig Del af Markedsfisken, medens II-Gruppen kun er af nogen Betyning som Markedsfisk nord for Horns Rev og i det sydlige Omraade udenfor 30-Meterkurven. Syd for Revet og indenfor 30-Meterkurven, hvor II-Gruppen er særlig tæt, har Væksten været saa langsom, at Mindstemaalet endnu ikke er naaet.

En Undersøgelse af de to Køns relative Hyppighed i hver Aldersgruppe har vist, at Hunnerne er relativt hyppigere nær ved Kysten end længere ude, og tillige, at for hvert af de undersøgte Felter tiltager Hunnernes relative Hyppighed med voksende Alder. Betragter man under eet alle Rødspætter ældre end et Aar iagttages der ogsaa en Aftagen i Hunnernes relative Hyppighed fra Kysten udefter. Summen for alle Stationer af Individer af en Aldersgruppe fanget pr. Time viser en lille Tilvækst i Hunnernes relative Hyppighed med Alderen, og dette kan forklares ved, at et Overskud af de ældste Hanner sandsynligvis er vandret ud af Undersøgelsesomraadet, siden de er i saa fremherskende Flertal ved de vestligste Stationer. Den talmæssige Fordeling af Hanner og Hunner forklares ved at antage, at Hanner har en større Tilbøjelighed end Hunner af samme Alder til at vandre ud fra Kystgrundene. De undersøgte Rødspætter blev alle anset for at være umodne, og den fundne talmæssige Fordeling kan ikke alene forklares ved, at modne Hanner muligvis allerede er vandret ud af Undersøgelsesomraadet. Den fra Kysten og udefter stigende relative Hyppighed af Hanner iagttages nemlig allerede tydelig for II-Gruppen, som ganske sikkert ikke indeholder modne Individer, og som næppe spreder sig vestpaa udover det undersøgte Omraade. Paa hver enkelt Station er Gennemsnitslængden for Hunner i Reglen ganske lidt større end for Hanner af samme Aldersgruppe. Men sammenligner man under eet alle Hunner og Hanner af en Aldersgruppe fra Omraadet syd for Horns Rev eller nord for Revet forsvinder denne Forskel, og vi er derfor tilbøjelige til at tro, at Væksten i de unge Aar er den samme for Hanner som for Hunner, og at den Forskel i Gennemsnitslængde, som iagttages paa adskillige Stationer, er fremkaldt ved, at de større Hanner er udvandret i større Antal end Hunner af samme Længde.

En Sammenligning med Fiskeforsøg fra Efteraarene 1903—1905 viser, at Tætheden for I- og II-Gruppen i Omraadet vest for Graadyb og indenfor 30-Meterkurven var mindst tre Gange saa stor i September 1922 som i de tidligere Aar, og Fiskeforsøgene fra Foraaret 1907 tyder ogsaa paa en meget ringere Tæthed end i 1922. Fra tidligere Aar er der kun faa Iagttagelser fra Omraadet nord for Horns Rev, men de synes at antyde, at Tætheden i 1922 er relativt stor udenfor 20-Meterkurven og lille indenfor denne Kurve. Med Hensyn til Væksten tyder de ret sparsomme Maalinger af aldersanalyserede Prøver fra Efteraaret 1905 paa, at Gennemsnitslængderne for II—IV-Grupperne i Omraadet vest for Graadyb indenfor 30-Meterkurven i 1905 var 4—6 cm længere end i 1922. Gennemsnitslængderne for de samme Aldersgrupper var i Feltet C kun et Par Centimeter større end i 1922, saa at vi kan antage, at det er Væksthastigheden i Felterne A_a og B_a, som i 1922 var saa tæt befolkede med Rødspætter, der særlig har forandret sig. En Sammenligning med Undersøgelserne i Foraaret 1907 viser, at Gennemsnitslængden af II-Gruppen nord for Horns Rev i 1922 staar mindre tilbage for Gennemsnitslængden fra den tidligere Periode, end Tilfældet er for II-Gruppen syd for Horns Rev, hvilket bestyrker Formodningen om, at der er en Aarsagssammenhæng mellem den ringe Vækst og den store Tæthed af I- og II-Gruppen vest for Graadyb.

En Sammenligning af Gennemsnitslængderne for de forskellige Aldersgrupper i Forbindelse med Resultaterne af Mærkningsforsøgene fra 1920 fører os til den Slutning, at de smaa Gennemsnitslængder, som vi har fundet for Aldersgrupperne i September 1922 især skyldes en langsom Vækst i 1922 og maaske i 1921.

Materialet fra 1903, 1905 og 1907 bekræfter den Iagttagelse, at Hunnernes relative Hyppighed aftager fra Kystomraadet udefter. Iagttagelserne fra 1903 og 1905 synes at tyde paa, at Hunnernes relative Hyppighed i 1922 er mindre end i disse Aar, hvad der maaske hænger sammen med en senere Indtræden af Modenheden og en deraf følgende senere delvis Udskillelse af Hanner fra Hunner.

Maalingerne af Markedsrødspætter fra B_4 (alle fra B_c) og A_3 viser, at Hyppigheden af Rødspætter over 30 cm's Længde er aftaget stærkt siden 1919, baade taget i Forhold til Antallet af Rødspætter over 27 cm og til Totalantallet af Markedsrødspætter. Prøverne fra den Del af C_2, som ligger sydøst for den nordøstlige Ende af Dogger Banken viser ogsaa en aftagende Længde fra 1919 til 1922, da Gennemsnitslængden af Rødspætterne endogsaa er mindre end i 1916. Der kan ikke være Tvivl om, at dette væsentlig skyldes Krigstidens Fredning og det paafølgende mere intensive Fiskeri, som har bevirket, at Gennemsnitsalderen af Markedsrødspætterne var særlig høj i 1919. For de Dele af A_3 og B_4, som ligger syd for Horns Rev peger de aldersanalyserede Markedsprøver i Retning af en formindsket Gennemsnitsalder for Markedsrødspætter fra 1919—1920 til 1922. Hvad B_4 og A_3 angaar, finder vi desuden i den usædvanlig langsomme Vækst i Sommeren 1922 og maaske i 1921 en Aarsag, som maa virke til at formindske Antallet af Rødspætter over 30 cm. i Forhold til det samlede Antal Rødspætter over 27 cm. Ogsaa i Sammenligning med Markedsprøver fra Aarene 1904—1905 er Prøverne fra B_4 og A_3 taget i Efteraaret 1922 underlegne i Henseende til Længde, og dette maa rimeligvis forklares ved den langsommere Vækst i Aarene 1921—1922.

III. Mærkningsforsøg i Foraarene 1920 og 1921.

a. De mærkede Rødspætters Vandringer.

Den 23de April 1920 udsattes ialt 300 mærkede Rødspætter paa fire forskellige Steder (Dybde: 4—12 m) i Nærheden af Graadyb (se Fig. 7 og 8). Inden Udløbet af Majmaaned genfangedes 16 af disse Rødspætter i A_3 paa væsentlig større Dybder end Udsættelsesstedernes. I Junimaaned genfangedes 69, hvoraf de 66 i A_3 sydvest for Udsættelsesstederne. I August og September ligger Genfangststederne for en Del længere ude end A_3, men i Slutningen af Vinteren og i det følgende Foraar sker Genfangsterne igen væsentlig i A_3 syd for Horns Rev. Forsøgene bekræfter altsaa de tidligere Erfaringer om en Vandring bort fra Kysten om Sommeren og en senere delvis Tilbagevenden til Kystomraadet.

Den 27de og 28de Maj 1920 udsattes ialt 200 mærkede Rødspætter paa to Steder (Dybde: 15 og 15.5 m) syd for Horns Rev (se Fig. 8 og 9). Inden Udløbet af Junimaaned genfangedes 66 af disse Rødspætter gennemgaaende paa lidt større Dybde end Udsættelsesstedernes. I Augustmaaned indfangedes yderligere 7 Individer paa endnu lidt dybere Vand, og derefter fangedes kun endnu 6 Rødspætter. Disse to Forsøg tyder paa, at Vandringen bort fra Kysten er mindre udpræget fra disse Grunde af Dybde 15—16 m end fra Graadyb. Af Fig. 10, som viser de længere Vandringer fra de 6 omtalte Forsøg, synes det at fremgaa, at Rødspætterne, som i Foraaret 1920 blev udsat syd for Horns Rev, har vist større Tilbøjelighed til at vandre vestpaa og sydpaa end nordpaa over Revet.

Den 24de April 1921 udsattes ialt 350 mærkede Rødspætter paa tre Steder (Dybde: 4—10 m) vest for Fanø. (Se Fig. 11—13). Allerede inden Udgangen af Aprilmaaned genfangedes 50 Individer og i Majmaaned yderligere 110. Genfangsterne fandt især Sted sydvest for Graadyb, lidt vestligere end Udsættelsesstederne. I Junimaaned indfanges 8, og i Juli igen 8 Rødspætter; for de sidste laa Genfangststederne kendelig længere ude fra Kysten end i Majmaaned. Derefter fangedes kun endnu 2 Eksemplarer. Ogsaa disse Forsøg viser en tydelig Vandring bort fra Kysten om Sommeren.

b) Genfangstprocenten for mærkede Rødspætter.

Af de 850 Rødspætter, som udsattes i Mærkningsforsøgene i Foraarene 1920 og 1921 genfangedes ialt 46 % (Table 25), og 44 % indfangedes inden Udgangen af det første Aar efter Udsættelsen. Ved Mærkningsforsøgene i Foraarene 1906—1912 genfangedes 53 % i Løbet af et Aar, men Genfangstprocenten er

større jo tidligere paa Aaret Forsøgene udføres, og i de af Forsøgene, som foretoges efter 14de April, er Genfangstprocenten i det første Aar efter Udsættelsen kun 46. Der synes altsaa ikke at være sket nogen væsentlig Forandring i Fiskeriets Intensitet.

Tallene i Table 25 antyder svagt, at Genfangstprocenten er større for Markedsrødspætter end for Undermaalsfisk, endvidere at for Rødspætter af samme Størrelsesgruppe er Genfangstprocenten for Hunner lidt større end for Hanner, og at følgelig Genfangstprocenten i det store og hele er større for Hunner end for Hanner, siden de udsatte Hunner gennemsnitlig er længere end Hannerne (se Table 24).

c) De mærkede Rødspætters Vækst.

I Mærkningsforsøgene fra April og Maj 1920 har man observeret den paa Fig. 14 indtegnede Gennemsnitstilvækst af Længden, som ogsaa for Majforsøgene ved en Korrektion er regnet ud fra Længden den 23de April, da de første fire Forsøg begyndtes. Den udjævnede Kurve viser, at den gennemsnitlige aarlige Vækst fra 1ste April 1920 til 1ste April 1921 er omtrent 7 cm. Man ser, at den observerede gennemsnitlige Tilvækst er betydelig større for September og Oktober end for Maanederne November til Marts incl., hvoraf følger, at den ved Udjævningen bestemte gennemsnitlige aarlige Vækst maa være behæftet med en ret betydelig Usikkerhed. For at danne os en Forestilling om denne, har vi sammenlignet den observerede Tilvækst i Længde for de 30 Individer, som er genfangede fra September 1920 til Maj 1921 incl. Deres gennemsnitlige Tilvækst er 6.1 med Middelfejl 0.6. Da der maa antages at have været en kendelig Vækst i Sept.—Okt. og i April—Maj, og da dette maa bidrage til at forøge Middelfejlen, kan man maaske vente, at Middelfejlen for den aarlige Vækst ikke overstiger 0.6.

De tidligere Bestemmelser af den aarlige Vækst ved Hjælp af Mærkningsforsøg i Horns Rev Omraadet er mindst lige saa usikre. Men da Væksten for Aarene 1908—1912 kun var henholdsvis 5.3, 3.1, 4.6, 4.5 og 3.5 cm eller i Gennemsnit 4.2 cm, kan der næppe være Tvivl om, at Væksten i disse Aar var langsommere end i 1920. For Aarene 1905—1907 fandt man derimod en aarlig Vækst af henholdsvis 7.9, 6.1 og 7.7 cm, hvilket er tilnærmelsesvis den samme som i 1920.

I Mærkningsforsøgene fra 1921 blev alle de genfangede Rødspætter indfangede inden Afslutningen af den første Vækstperiode og 92 % af dem i Løbet af de to første Maaneder efter Udsættelsen, saa at de kun giver ringe Oplysning om Væksten. De i Juni og Juli genfangede Eksemplarer lader formode, at Væksten var langsommere i 1921 end i 1920.

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